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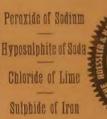
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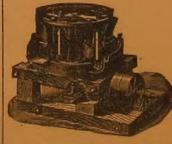
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s Co , Edward P		Little Alaska Gold Washer 80	Shaw, Willis
eneder & Sons, Theo 2			Shalls Balling Co.
erican Diamond Rock Drill Co	F		Shultz Belting Co
rican Injector Co	100	IME	Smith & Co, Francis
ury, L. E			Coult & Thomas
	Fay & Ragan Co., J A 24	Macheth & Co. Taylor	Smith & Thompson
	Ferrari, Guido	Machinery and Electrical Co. 25	C O Machinery Co
	Possil Meal Co	McValvey Chas C	S. S. Machinery Co. State Ore Sampling Works
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B	Powler, G. C.	Mary Plan Cald Canan	Stewart, John
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the same of the sa	Fulton Engine Works	Manesse Co., L. 26 Mathison & Co. 4	Surman & Co, J. R
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7 & Co 8	Frue Vanning Machine Co	Moutgomery Machinery Co., J H 24	II .
er from Works		Morgan-Watson Mining & Construction Co. 20	T
dev & Co., A. I		Moore & Co Chas C	_
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etallic Assay Office 20		The same	Tatum & Bowen
ord Drill Co 80			Taylor & Co , John
Chas. E, & Co		N	Taylor Iron and Steel Co
ev-Ramsey Lumber Co	Galusha & Son, M. R 27		Temple Machine Co
tis & Son, F. E			
h-Canadian Invest. Mining Syndicate 27	Godfrey, A. G	National Association of Stationary Engineers 20	Thompson & Heron
n Horace F., M. E	Gold & Silver Extraction Co. of America Ltd 6	National Iron Works 21	
nell, James S		National Pipe Bending Co 28	Trenton Iron Co., The
acu, janes S.,	Goodyear Rubber Mfg Co	New Haven Manufacturing Co 25	Troemner, Henry
Manufacturing Co., M. M.	Graphite Lubricating Co		Trunx Manufacturing Co
ck Mfg Co, M C 31	Crimmond Chas P 81	Nichelson, & Co	
ngame, K. H	Grimwood Chas P	Norwalk Iron Works	
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rnia Perforating Screen Co	Hail & Murray	Ogden Assay Office	Van Der Naillen, A
ornia Perforating Screen Co	Hall & Murray	Ogden Assay Office	Van Der Naillen, A
ornia Perforating Screen Co	Hall & Murray	Ogden Assay Office	Van Der Naillen, A
ornia Perforating Screen Co	Hall & Murray	Ogden Assay Office	Van Der Naillen, A
ornia Perforating Screen Co	Hall & Murray	Ogden Assay Office	Van Der Naillen, A
ornia Perforating Screen Co	Hall & Murray	Ogden Assay Office	Wan Der Naillen, A
ornia Perforating Screen Co	Hall & Murray	Ogden Assay Office	Van Der Nailieu, A
ornia Perforating Screen Co	Hall & Murray	Ogden Assay Office	Van Der Naillen, A
ornia Perforating Screen Co	Hall & Murray	Ogden Assay Office	Wan Der Nailien, A
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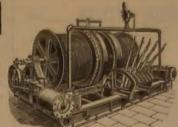
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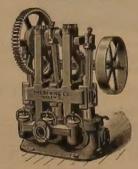
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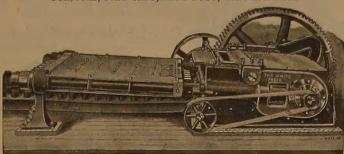
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CALIFORNIA STATE MINING LAW.

During the last few days the daily papers of this State have been printing an old chestnut, ancient and venerable, which a San Francisco daily had only discovered, in relation to the late State Mining Law. For in the issue of this JOURNAL, of 15th April last, under the above heading we printed a copy of the State Assembly Bill No. 140, by which that law was repealed, and says in Section 1 "An act to repeal an act prescribing, etc., etc., is hereby repealed," and in that issue made the remark: "Though the wording of "the act is such that it defeats itself, it no "doubt will hold good, and by it the State "law of 27th March, 1897, has been repealed, etc., etc."

Since the publication of the recent articles referred to in the daily press, consultation with the best legal talent and a member of the Legislature informs us that the Supreme Court (if the matter is brought to a test case) will uphold the intention of the Legislature to repeal the local law, even when through error the wording of the act, if read in a certain way, seems to be contradictory. There is no doubt as to the origin of this scare, for this latest discovery is reported to have made by eminent attorneys in San Francisco, who were no doubt looking for a job, and the present prosperous condition of the mining industry presented a grand chance.

As this error was not observed in time by our worthy Governor, who has the qualifications of a great gauger of laws, natural, hu-man and divine, we still fail to find a reason on this occasion, as on the former one, to account for the fact that even one legal error passed observation by the eye which is capable of interpreting correctly all law. As a consequence, the only law now in force is the Federal Statute regulating the location of mining claims.

It is to be regretted that the bill framed by Assemblyman Mack, of Inyo County, which was intended to take the place of the late

State law, and make its operation more easy, did not become a law on account of being vetoed, as it was not signed by the Governor.

The late State law, although it was not perfect or all that could be desired, was much to be preferred to the Federal law which is now in force, as it made work during the first year necessary, and enforced early development of the caim, thereby making the occupation of the wholesale or professional claim locator, who does no work but merely relocates every two years, impossible. As the title to State Assembly Bill 140 is clear, and does not contain the contradiction found in the first section of the act already quoted, the intention of the legislators to repeal the late state law will be upheld by the courts, and any parties who now locate or jump claims, by thinking that the late State law is still in force, are in error.

BRITISH TRADE IN AMERICAN SILVER,

The returns of the London Board of Trade as regards the imports and exports of silver for the first six months of 1899 present an object lesson to the American student, politician and miner, which is extremely interesting at the present time. In reply to the contention that the Bank of England controlled and fixed the market value of United States and South American silver, the stereotyped answer was formerly that the price of silver, like other commodities, was regulated by the law of supply and demand. To refute that claim the fact remains that in spite of the increased production of silver on the American continent the needs for it in Europe, Russia, India and China, have forced the Bank of England to pay over one and a half cents an ounce more for it than during last year. The following table shows the British imports and exports for the years 1898 and 1899 ending 30th June:

	IMPOR		EXPOR	TS.
	1899	1899	1898	1899
United States	74,166,871	£4,668,379	£ 7,303	7. 4,887
Other Am. c'ntr's	777,741		41,725	161,168
Africa	57,858	74,439	409,728	331,761
Australasia	27,106	67,256	59,967	91,578
Rurope	997,915		2,747 828	4,039,203
The East	329	433	3,528,748	3,325,774
C'tr's not specified	11,171	7,540	41,920	25,68
Totals	76,038,991	£6,157,852	£6,837,219	27,980,051

The British exports to the east are classified in the following table:

	1898.	1899		e	HANGE
China	859,355	6 742,096	T.	£	388,641
lapan	. 150		EL.		1,649
Brit. East Indies	3,169,243	2,582,778	D_i		586,465
Totale	₹8 308 758	£9 995 774	13	1	202 020

The large amount sent to Europe was on Russian account and amounted to £2,778,198, as Russia is doing much railway building and trade in Northern China.

When it is remembered that England produces next to no silver although there was exported £1,822,199 more than was imported and that Australia is the only colony that supplies any amount worth considering, showing that a profit was made in silver purchased the year before. The dependent position of the United States and other South American countries in allowing the Bank of England to control the price of a great and valuable economic necessity such as silver, is an industrial question of the highest importance to American trade. Protection to home industry is the chief plank in the platform of the Republican party in the United States, but there is no silver lining admissable. Very recently our worthy and respected President intended making a visit to the West and Pacific Coast but the fact that there existed in this section so many deserted towns where once a flourishing silver mining industry was conducted would

have made the trip equal to a visit to a cemetery in which an important American mining industry lies buried in demand to British trade interests and want of protection to home industry and the absence of the medicinal effects of prosperity to it. To aid American foreign trade with the East and Orient is one of the objects to be attained by protecting our silver mining interests. This end can best be accomplished by our government negotiating treaties with other South American silver-producing countries to control the silver trade of these countries by prohibiting the export, in bars or other form, except as coin minted by each country at a fixed value. By so doing silver coin alone would have to be purchased to supply the world's demand and give to our silver a market value for export equal to that which it has in circulation in our own country. That was exactly the condition of affairs that existed before the Bank of England planned its profitable and successful trade in the monopoly of an American product which the nations of the world cannot do without, and which it now conirols.

THE MINING INDUSTRY.

If in volume, value and ramification of its influence upon the welfare of a nation government recognition and encouragement should be given an industry, then that of mining holds a place hardly secondary to any other.

Agriculture in all its branches no doubt is more important than any other, from the fact that it supplies food and clothing in the main for the human family. It is an industry that cannot be dispensed with. It employs more labor than any other.

It is maintained by some men engaged in railroad transportation that railroads are the largest employers of labor in the country. In this they are in error. Mining in all its branches employs more labor by far than railroads and more than any manufacturing industry or than commerce. Except agriculture it adds more to the wealth and supplies more of the wants of the people of the na-tion. Were mining in all its phases to cease, commerce in volume and bulk of the commodities handled would dwindle to two-thirds

if not one-half of its present proportions.

Thus in a general way the importance of mining is made to appear, which would be vastly enhanced if space permitted going into statistical details. It perhaps further should be said that the products of mines enter into house and railroad structures, it furnishes the principal materials for ships, machinery and implements of all industries, and the utensils for the homes. It is difficult to point out where iron, steel, copper, lead, zine and coal are not necessities of life or useful in promoting human happiness. Last, but not least, mining furnishes the basis of the monetary systems of the world, the media of exchange for all commercial transactions, domestic and international.

In many nations a department of government is provided to preside over, regulate and encourage mining industries. try there is not even a bureau devoted to that great branch of business. In the Department of the Interior the General Land Commissioner is charged with the execution of the laws on the subject of locating and patenting mining claims on the public domain. The Director of the Mint gathers statistics on the production of the metals which enter into coinage, and the Treasury Department through its custom houses keeps an account of the exported mining products.

There is a department devoted to agriculture equal in dignity to the other great departments of the general government, and there is an agitation in favor of a department of commerce, and one of manufactures. Why not create also a department of mining?

It is true that each branch of Congress has a Committee of Commerce, Manufactures, Agriculture and Mines and Mining, but an examination of legislation that has been enacted shows that less has been done to foster mining than any other of the industries, except possibly of agriculture in the matter of duties in tariff laws.

The functions of government should be enlarged to keep pace with the growth of the nation. By taking the great industries under its wings, and granting to each an impartial and fostering care, the industrial and commercial branches would be brought into harmony and materially energized.

THE WORK OF THE INTERNATIONAL ASSOCIATION FOR TESTING MATERIALS.*

Prior to the year 1800 little was known of the properties of the materials of construction. Gallileo had shown in 1638 that the strength of a rectangular beam varied with the square of its depth, Hooke in 1678 had announced the law that the stretch of a spring was proportional to the stress upon it, various authors had discussed the forms of beams of uniform strength, and Euler in 1744 had enunciated his formula for the resistance of columns under compression. Theory was far in advance of practice, for experiments had been so few and imperfect that the elastic limit was scarcely recognized.

During the years from 1800 to 1850 great progress was made in the theory of elasticity, and a slow growth took place in knowledge of the properties of materials under stress. The introduction of railways and the consequent necessity of providing a firm roadbed and safe bridge structures gave a powerful stimulus to the investigation of metals in order that ample security might be afforded with the greatest degree of economy. The methods of testing were, however, so imperfect that progress was slow, and, with the exception of the classic researches of Hodgskin son, the work of this period was mostly of value as a preparation for that of the future.

After 1850 large testing machines for special purposes began to be built, elongation and ductility began to be carefully studied, and soon after 1870 it was recognized by many manufacturers that physical tests of metals were imperatively necessary in order to secure uniformity of product. As these tests were multiplied and the records subjected to investigation, the knowledge was gained that the strength of a specimen depended upon its size and proportions and also upon the manner in which the load was applied. The term elastic limit assumed a new significance when it became recognized that it could be defined and measured in different ways. In short, it was found that tests of materials must be made in a similar manner in order to render the results comparable. This idea, although long recognized, has proved a difficult one to realize. It has been discussed by many engineering societies, some of which

have attempted to formulate standard methods. Finally the International Association for Testing Materials was formed in order to study the whole subject and endeavor to arrive at conclusions that should be authoritative.

In 1882, through the influence of John Bauschinger, a number of German experimentors met at Munich and discussed the question as to how uniformity in the methods of testing materials could be promoted. As a result of this meeting formal conferences were held at Dresden in 1884, at Munich in 1888, and at Vienna in 1893, delegates from other European countries being also present. The reports of the proceedings of these conferences, published in Bauschinger's "Mittheilungen," attracted wide attention, and the great value and importance of the discussions became universally recognized in engineering circles. In short, the movement assumed an international character.

In 1890, as a result of the international congresses of engineering held at Paris in the preceding year, the French government appointed a commission to formulate standard methods for testing the materials of construction. Its report, published in 1894 in four large volumes, is one of the most valuable contributions to the subject, but from the first it was recognized that ultimate conclusions could not be determined by a commission of one nationality, and accordingly, since, 1895, the French government has given hearty support to the work of the International Association.

In 1895, as a result of the four preceding conferences, the fifth conference met at Zurich, all European countries, except Turkey, being represented. The United States government was represented by an army officer and the American Society of Mechanical Engineers by a delegate. At this congress the International Association for Testing Materials was formally organized, its object being, as stated in its statutes, "the development and unification of standard methods of testing for the determination of the properties of the materials of construction and ot other materials, and also the perfection of apparatus for that purpose." This meeting at Zurich hence assumed an importance far greater than any preceding conference, and it may be called the first congress of the International Association.

At the Vienna convention of 1893 there had been appointed 20 committees on technical subjects, and reports from many of these were presented at the Zurich congress of 1895. These reports were published in the French and German languages in the official organ of the Association called "Baumaterialienkunde," the first number of which appeared in July, 1896. The work of some of these committees was continued, other subjects were proposed for future consideration, and a council was organized to transact the business of the International Association in the intervals between the congresses.

In 1897 the second congress of the International Association was held at Stockholm, there being present 361 members representing 18 countries. The United States government was represented by an army officer and a navy officer, and the American Society of Mechanical Engineers by a delegate. The congress continued in session for three days, reports of committees were presented, papers read and discussed, and plans outlined for the future work. It was resolved that the next congress should be held in Paris in the summer of 1900, and the council was authorized

to appoint technical committees to make reports at that time on special problems relating to the objects of the Association.

At the meeting of the International Council held early in 1898 appointments were made of chairmen of 21 committees on technical problems, and the number of members on each committee from each country was assigned. It was also recommended, in order to expedite the appointment and work of these committees, that the members in each country should meet and form a national section of the International Association. In compliance with this recommendation a number of the American members met on June 15, 1898, and organized an American section, whose first annual meeting was held at Philadelphia on Aug. 27, 1898, and whose second annual meeting I now have the honor to address.

The membership of the International Association numbered 403 in 1895, 953 in 1896, 1.169 in 1897, 1.488 in 1898, and is now probably about 2,000. Germany takes the lead in regard to number of members, it having 387 in 1898, while Russia had 315, Austria 158, England 83. Switzerland 83, United Strtes 68, Sweden 68, France 66, Holland 48, Norway 42, Denmark 39, Spain 36, Italy 35 and 60 from nine other countries. With regard to the American membership, it may be noted that it numbered 6 in 1895, 25 in 1896, 60 in 1897, 68 in 1898 prior to the organization of the American Section, 106 in February, 1899, and that it is now nearly or quite 125.

(To be Continued.)

On another page we publish in tabulated form a report of the production of minerals of the United States in 1898, from the advance proofs of *The Mineral Industry* by R. P. Rothwell.

These statistics have been collected for the seventh annual volume of *The Mineral Industry, its Statistics, Technology and Trade,* which will shortly appear, and they are the most comprehensive and accurate statistics of our mineral production ever yet published.

The mineral and metal production of the United States in 1898 here recorded, was the largest in the history of this or any other country, and is an exhibit worthy of the attention of economists and lawmakers. The economic details published in *The Mineral Industry* volume show that the United States is rapidly attaining the point where it will be the greatest exporter of minerals and metals of all the commercial nations.

The Ingersoll Sergeant Drill Co. of New York have issued their latest revised Compressor Catalogue No. 3. While the tables are very much the same as in their former catalogue, they have added the illustrations of some very important plants and machines, and also give exhaustive series of formulæ and tables on "The Flow of Air Through Pipes." This is very valuable information and it has been compiled at considerable expense. Parties interested will be supplied with copies of this catalogue upon application.

The latest Bulletin, No. 8434 of the Bullock Electric Mfg. Co. of Cincinnati, Ohio, has just been received by the JOURNAL. This bulletin is descriptive of the latest Bullock Engine type of generators, and contains some valuable tables.

^{*}An address by Prof. Mansfield Merriman of Lehigh University, Chairman of the American section of the Association, at the second annual meeting held in Pittaburg, Pa., Aug. 15-16, 1899.

MINERAL PRODUCTION OF THE UNITED STATES IN 1898.

BY RICHHARD P. ROTHWELL,

	1	1	1 3,000				1909		
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e routes.	Moon UPOS.	Customary Measures	Metric Tons.	Totals:	Per M. Ton.	Customary Measures	Metric Tous.	Totals.	Per l
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Asphaltum Asphaltic limestone	Sh. T	9,100	2,168	11,450	5 BR 3-16	14,099	19,791 44,500	70,493	8
		47,470 96,430	49,063	138,173 105,730	4 41	28,347	95,700	112,988	4
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Coal, anthracite	Sh T	52,545,133	47,739,831	85.857,717	1 80	80,848,605	47,943,940 149,875,737	81,445,937 198,410,954	0
Coal, bituminous	Sh T	50.511	81,266	150,013,145	2 99	49,689	90,2000	2.39 E. T. OO.	2
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Emery	8b. T.	1,900	1,794	82,000 111,892	68:30	9,966	9,069	148,8.03	83
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Preciona gropes	La T.	1,007,807	1,083,480	8,092,101	2.50				
Pyrites	L. T.	188,268	185,508	404,600	2.90	191,160	191,919	5890,329 4,789,664	3
Salt Quitannin	Bbls .	183,566 15,862,963 90,965	8,009,525	3,899,556	3.84	18,755,894 88,440	8,366,107	590,551	
Diatom, carth	Sh.T.	8,000	9,799	80,400	11:17	1,890	7,965	11,000	8
Flint	Bh.T.	98,407	95,771 768,000	88,817	2 17	85,695 # 800,000	88,290 81X,800	73,513 #1,178,500	
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Grindstones	Sh. T.	36,502	88,114	842,180	10.38	36,669	\$6,968	439,615 107,990	12
Whetatones	White	1.631	1 480	97 220	3 70	1.665	1,600	5.397	1000
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Pigment	Sh T	16,904	15.335	169,040	n11:02	18,862	17,111	158,635	0
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stone, for building.	1. TE	4,947,688 NIL	4,815,681	c30,000,000 1,608,983	0-68	5,975,819	5,360,232	92.804.900	- 67
tone, lithographic	Sh. T.	Mil.	NG.	NA.	NII.	115	102	n 2,240	421
Strontium sulphate	Sh. T.	1 600	1 7712	94 814	95 6 66 m 200-29	9.796	2,770	69,754	mgl
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No		Mean	Customary Measures	Hetric Tons.	Totals.		Custom Ty Measures	Metric Tona.	Totala.	Per M.
\$5 \$5 \$5 \$5 \$5 \$5 \$5 \$5 \$5 \$5 \$5 \$5 \$5 \$	Aluminum aujphate Ammonium sulphate Caletum carbide. Carbornachum Cement, alag Loike Copperasi Copperasi Corashed ateal. Grashite, artificial Lead, white s Lead, red Lead praces miner	Sh T Lb Sh T Lb T Sh T Sh T Sh T Sh T Sh T Sh T	15,465 66,903 8,111 1,025 1,025 19,000 12,768,901 13,762 99,397,570 99,397,570 102,952 103,952 103,953 6,017	94,945 19,335 994 479,655 95,986 7,074 433 7,794	1,109,875 139,884 134,750 163,812 60,000 23,871,925 16,184,746 16,1834 16,149 9,522,930 744,759 75,130 61,434	m37 56 m.86 51 77 18 8 27 79 2 00 5 5 52 5 5 5 5 5 5 5 5 5 5 5 5 5 5	86,605 3,980 (5) 1,591,102 157,607 15,897,707 11,280 87,057,800 88,647 98,170 9,180 5,110 7,000	17,007 51 104 3,256 (b) 723 14,422 107 10,284 12,27 10,284 12,27 10,284 12,27 10,284 12,27 10,284 12,27 10,284 12,27 10,284 12,27 12	1,478,075 179,050 (6) 151,444 26,721 20,570,564 22,677 46,557 11,600 194,500 194,500 770,100	0.000 17 18 18 18 18 18 18 18 18 18 18 18 18 18
100	Venetian red	9b. T	2,196	1,096	40,790		3,750	2,967	19,432,823	25.70

	META	LS PRODUCE	D FROM FO	BEIGN ORES	AND BULL	0N. (nn)		
			1897.		188.			
Metals.	Curtomary	Quant	ities.		Quantities			
an events.	Measure.	Customeny Measure.	Kgm.	Values	Contomary Measure.	Kgm,	Values.	
Copper Gold Land Nickel	Pounds Troy ozs Short tons Pounds Troy ozs	26,938,254 684,963 92,117 4,699,390 40,218,776	12,219,112 18,155 88,568,(18) 1,859,(10) 1,250,(8)	12,891,583 12,891,589 6,595,577 1,418,390 24,046,596	86,005,302 1,005,502 69,300 7,127,761 59,791,000	16,384,600 33,142 80,029,674 1,284,149 1,386,500	\$4,847,330 \$22,004,560 6,744,200 2,459,044 83,472,560	
Manal makes		-		\$47,127,374		. articlemen	\$56,948,120	

In using the statistics in the loregoing tables reference should also be made to the detailed tables under the respective captions further on in this volume, where many explanatory notes at the statistics will be found. The following notes refer to the four preceding tables (a) [7] Reduced to a basis of 58 per cent, such (b) Not emusuate the barrel of salt weights for the statistics will be found. The following notes refer to the four preceding tables (a) [7] Reduced to a basis of 58 per cent, such (b) Includes a small remonst made from sait (f) Average value of Lake copper at New York, less of 25 per 16. (a) Includes splegel (d) Fartly estimated. (c) Estimated. (d) Amount recovered as a by-product (g) Barrels of 400 b) (l) Includes into the control of the control of the control of from central control of from central control of from central control of from central control of the control of from central control of the cont

The Copper production increased from 223,825 long tons in 1897 to 239,241 in 1898. The increase occurred chiefly in Arizona and Michigan, Montana showing a decrease, owing chiefly to the smaller output of the Anaconda.

of the United States in 1898 was \$709,816,750 against \$648.834,899 in 1897. Of the production in 1898, \$314,255,620 was the value of metals against \$272,178,392 in the previous year, and \$433,659 141 ores and minerals, against \$407,913,912 in 1897. The values given for ores and minerals include \$58,098,orr in 1898 and \$31,287,405 in 1897 for bauxite, manganese and iron ores, which were used for making aluminum, ferromanganese and pig iron. These duplications were deducted in the aggregate values stated above. Eighteen secondary products for which sta-tistics were collected, derived from some of the ores included in these totals, had an aggregate value of \$49,432,829 in 1898, against \$41,718,420 in 1897. There was also a production of copper, lead, silver and gold from foreign ores and bullion, valued at \$58,948,125

The total value of the mineral production

in 1898, against \$47,127,174 in 1897.
The production of aluminum in the United

The production of aluminum in the Contest States in 1898 was 5.200,000 pounds (\$1,690,00) against 4,000,000 (\$1,400,000) in 1897.

The production of metallic antimony in 1898 was 2,000,000 pounds, (\$165,000), against 1,500,000 (\$107,250) in 1897.

The domestic production of gold in 1898 was 7,148,642 troy ounces (\$65,082 430), against 2,864,576 (\$59,210,786) in 1897. The production of silver was 58,763,127 ounces, against 56 457,292 in the previous year. The largest part of the increase of gold came from Colorado, while Arizona, Idaho, Montana, South Dakota and Utah made important increases. Arizona, Colorado, and Utah made increased outputs of silver, while in Montana there was a large falling off and in Utah a small one. Beside the production above reported, 1,065,552 ounces of gold and 39,784-coo ounces of silver were smelted in the United States from imported ores.

The production of pig iron in 1898, exclusive of spiegeleisen and ferromanganese, was 11,560,166 long tons, against 9,478,985 in 1897. Of the production in 1898 7,337,384 tons were Bessemer pig, against 5,795,584 in the previous year. Basic pig increased from 556,391 to 785,444 tons. The remainder of

the output is classed as foundry and forge iron. The domestic production of lead in 1898 was 228,475 short tons, against 197,718 in the previous year. The more part of the increase was due to Colorado and Utah. There was a small increase in the production of Missouri and a small decrease in that of the Coeur d'Alene. The output of Montana fell off about 2,000 tons. Beside the above, American smelters in 1898 recovered 89,200 tons of lead from foreign ore and base bullion.

The domestic production of nickel was 11,145 pounds, all from Missouri, against 33,-700 in 1897. American refiners, however produced in 1898, from both damestic and imported ores, 7,138,929 pounds.

The production of quicksilver in 1898 was

30,493 flasks (\$1,109,945), against 26,079 (\$910,418) in 1897, all from California.

The zinc production in 1898 was 114,104 short tons, against 100,387 in 1897. The production of New Jersey and Virginia fell off from 9,900 tons to 7,805. The remainder of the output each year, with the exception of a few hundred tons of ore mined in Tennessee, was smelted from ores mined in southwest Missouri and southeast Kansas.

THE USE OF ELECTICITY IN MINING.

THE KOOTENAY-ROSSLAND POWER TRANSMISSION.

BY GEO. P. LOW, EDITOR OF THE JOURNAL OF ELECTRICITY.

Kootenay district includes that portion of British Columbia lying on the Canadian boundary immediately north of Spokane, Wash. It is an exceedingly rough country. The crest of the Rocky mountain range forms its eastern boundry and the Selkirk and Purcell ranges, paralleling the Rockies, run through its center and thus separate it into its east and west divisions, each of which has an average width of from sixty to seventy-five miles, by a length of over two hundred miles. The district is very heavily wooded with dense underbrush or of bleak and barren granite formation, according to altitude or precipitousness. and the wild, rugged grandeur of mountain scenery, which has. above all other features, made the Canadian Pacific Railway world-famed, is mostly located within its confines. Curious indeed too, are the formation of its lakes and water courses. Inland fresh water seas, almost innumerable, and of all shapes and sizes, mark the country on every hand, and the multitude of rivers supplied from them eloquently bespeak permanence for the sources of the mighty Columbia. Water is everywhere as are also the Indian and frontier names, euphonious or otherwise, such as the town of Illecillewaet, the Spillimacheen river, or Horse Thief Creek. But an idea of the broken and erratic

topography of the Kootenay district can not be better conveyed than by reference to the seeming antipathy which the Columbia and Kootenay rivers bear each other in their early courses. The Columbia has its source in upper Columbia Lake, whose bead or southern extremity is about fifteen miles above the Canadian boundary line. Thence the Columbia flows in an almost due northwest. erly direction for practically two hundred miles, whence it turns southerly and then westerly, first through the West Kootenay district and then into the United States and on to the Pacific ocean.

A few miles east of the Columbia, at a point some sixty miles below its source, are

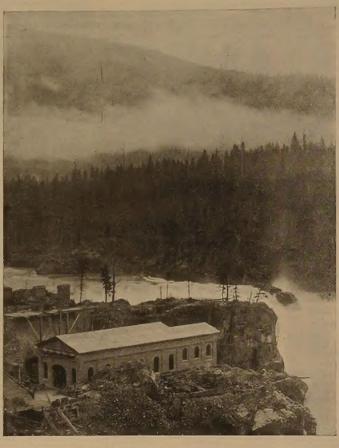


FIGURE 1.-LOWER BONNINGTON FALLS AND POWER HOUSE.



FIG. 2-A GENERAL VIEW OF BONNINGTON FALLS AND THE POWER HOUSE.

two comparatively small lakes a mile or so apart. From the northerly one the Beaver Foot River rises, eventually reaching the Columbia; in the southern lake the Kootney finds its source and continues down in a southeasterly direction, parallel with and at a distance varying from ten to fifteen miles from the Columbia River, though the streams flow in opposite directions for about sixty miles. When the head of the Columbia is reached and further paralleling is impossible, the Kootenay approaches within three miles of its rival river but quickly turns from it, flowing away one hundred and fifty miles further south into Montana, whence it retraces its course into British soil and finally joins the Columbia near Robson, some thirty miles north of the boundary line. Before doing so however, it forms the Kootenay Lake, which is perhaps sixty miles long and from four to eight miles wide, and from the lake it continues to the Columbia through a broad, resistless water course something less than fifty miles in length. It is near the lower end of this portion of the Kootenay River, which forms the connecting link between Kootenay Lake and the Columbia River, that the Bon-nington Falls are located, and at the lower Bonnington Falls is the generating station of the West Kootenay Power and Light

Company, Limited. Thirty-two miles distant is Rossland, which is one of the newest and most prosperous and promising gold mining camps in British Columbia, and in which electricity is not only fast superceding all other forms of power in mining work, but is also even put to characters of mining service ordinarily classed as impossible of accomplishment. It has been my fortune to make personal examinations of the principal electric power transmissions of the West, and it is without hesitation that I state that in none of them is the West Kootenay transmision exceeded in points of thoroughness, of engineering design and commercial advantage. While the heroic



DELLEY & WHOMEN AND A SERVICE DAME AND DELLEY

manner in which it has grappled with every phase of the power problem as applied to mines, and the thoroughness with which it has worked out the complete solution of these

problems enables it to stand alone as one of the most perfect mining transmissions to be found on the Parthe coast After a long familiarity with experiences which have been hed in California transmissions in attempts, generally futile to operate mining hoists. by induction motors one is quite impri-pared on teaching Rossland, to be intormed that for mouth. the War Engle horst at that place has been operated by a good borse power induction motor and that the s reace therefrom has ti en alisolutely per tect superfect indical. that the Le Rot more is to have its steam hoist displaced by a horst operated by a you horse power induction motor after the plan of the War Eagle hoist as soon as the Kootenay company

has enlarged its plant and can furnish power for its operation. All electrical and mechanical details concerning these and many other features of all important interest will be given in this article.

Among these further features may be briefly enumerated the extraordinary thoroughness and reliability of the water power development, the difficulties which attended the building of the pole line over a rugged route wherein could be found but a few infles of practically level line out of the entire distance and where in its length of 32 miles the altitude of the line varies at different points by over 2,200 feet. A novelty in the line of construction consists in the use of roofed poles and cross arms, and the Columbia River is crossed with a single span 1,500 feet in length without the use of supporting cable. The plant was built essentially for power purposes and of its present load only about twelve per cent is in lighting, the remainder being in both synchronous and induction motors in mining duty for the operation of compressors, horsts took breakers to sters, bucquetting machines, blower, machine shops, and their equipments used in end about minting and smelting work.

The general view of the Ronning ton Falls, upper and lower and the country about the power house is given in the occumpanying engraving. Here the Selkirk Mountains rise to an elevation of over those leet above the river or to an elevation of about 1 year leet above the sea level and the beautifully snow capped peaks of the rigged range, together with the grandour of the chain of the fills forms a charming and picturesque scene. At low water the falls both

upper and lower are capable of delivering 207,000 horse power but the West Kootenay company has thus far attempted to utilize only a portion of the lower falls, which under the

solution of these a portion of the lower falls, which under the to the walls of each g

FIGURE 1 INTERIOR VIEW OF THE WEST KOOLISAY LOWER HOLSE

40 foot head available at extreme low water, are capable of delivering 100,000 horse power

The Kootenay river is 100 feet wide at the lower falls and in developing a portion of its water power, the West Kootenay company constructed a canal 650 feet in length and some 26 feet in width, all through the hard country rock. Towards its lower end the canal widens out into a forebay 54 bet in width, the forebay being closed in hy a solid concrete dam to feet high and 25 feet in width at the bottom, tapering to six feet in width at the top Between two high bluffs at a point in the head race, 250 feet above the concrete dam, has been constructed a wooden dam sloping at an angle of 42 degrees up stream and having a vertical height of 44 feet. The

all, and timbers of this fam are spaced free test apart and all of the times and all of the times and all of hilled to the rock the chest of a the hilled to the rock the chest of a matter a control to an early to a hill the hill of the rock the chest of an early to a ways and it, of pot to exact he impact of water though the rock to a water through the analysis of the matter are a grant to an are the control to an are the control of the water entering the control of the water entering the control of at all time.

Lower Runnington halfs have in extreme difference of held at test which measures the held of water a clabbe at the power house. The main concrete dam is possible with three beders, two of none but each one of ten feet. The upper ends of the end ers are losed by gates their measure respectively a feet by the elections of a fronting of rescale of wood and consist of a fronting of rescale timber to which is sold by later tends of the end on set of a fronting of rescale timber to which is sold by later depth in high planking. The two outside traines extend upward a gate and to the walls of each pit are bolted the ricks

for raising and ower ing the gates gates are further prosaled each with a small around thood gate in mehrance to inches in sec and the man gates are raised and the rehs means other, are mans " kidly by a fiter the top of the time The windle outer or ng the healy at manager operated by one more Physical other tertures are admir chay shown in the crawing who be villac one; and the article showing the end clearing of the stam power to tse and tail race three steel penstreas each noe set adam. eter by 10 hert w terrigity or gay the region the courte to damp rester the hydrau section of the poser acree rear the base of the dam. The back of the dam prictically forms one side of the power house and tall rice, the latter extending at right angles to it and consisting of a pit



approximately posters in depth by so teet in

PIGURE - RICAR VIEW OF POWER HOUSE SHOWING DRAFT OF

width, extending nearly the length of the power house, which is 66 feet. In the clear water the tail race is flanked by built masonry and concrete retaining walls, which vary from four to six feet in thickness, and extend upward to approximately the level of the power house floor. The floor plan of the power house shows the arrangement of the turbines and their mode of connection to the generators' Bolted to the lower end of each penstock is a 13-foot casting, containing one pair of 39 inch horizontal cylinder gate tur-bines. To these castings or wheel housings are bolted the draft tubes, which are 22 feet in length and ten feet in diameter at the lower end. The housing is supported on each end by the retaining walls of the tall race and are further carried by I beams. The turbines for driving the exciters are supplied with water taken from the main turbine housings in the manner shown on the ground plan of the power house.*

To be more explicit, the three 40-kilowatt, 125-volt multipolar exciters are direct-driven from independent horizontal, 12-inch registered gate turbines which are contained in the cast iron flumes, the latter in turn supported by transverse beams of the large wheels, while bolted to the cast iron flumes are the draft tubes and feeders. The latter are connected to the shafting of the large wheels from which they derive their water supply. The portion of the power house containing the generators and switchboards together with the transformer house built thereon as an L, is bedded on the solid granite rock, which, after being suitably dressed and surfaced with concrete, gave most perfect foundations for the heavy machinery to be placed therein. A single roof covers the en-tire structure with the exception of the transformer house which is independently roofed. The building is fireproof, with walls of brick and roof of wood, covered with galvanized The inside dimensions of the turbine house are 25 feet by 64 feet; those of the generator room are 311/2 feet by 66 feet, while the transformer house measures 171/2 feet by 28 feet. A flight of nine stairs takes one from the floor of the generator room to that of the transformer house, the difference in elevation of the two floors furnishing space for the blowers of the air blast transformers and ducts, as will be described hereafter. The height of the building from floor to the ridge of the roof is 40 feet, and ample room is thus provided for substantial framing on which to carry the tension leads.

(To be Continued.)

CORRESPONDENCE

ARIZONA.

CHLORIDE, Ariz., Aug. 24, 1899.

Another big mining sale has just been made here, and still another that has not yet matured, but there is no doubt but what both sales will be fully consummated, and large forces of men put to work. The first is the sale of the Lucky Boy mine belonging to John Smithline, and the purchase price was \$25,000, with twenty-five per cent down, the balance to be paid in short installments. The mine is a good one, and since its location and partial development two years ago, has produced considerable wealth for its one owner. It was a common thing that when Smithline wanted or needed money for ordinary ex-

. See our next issue.

penses that he would climb to Cerbat range to his mine and stay till he had taken out a shipment, after which another cessation of work would ensue until he wanted more money. This comprises all the work done, but as the owner was a strong and good miner he made his licks and shots count until at present there is a tunnel nearly 100 feet in the mountain, besides a shaft of 30 feet and a cabin and such other conveniences for living as could be obtained.

A beautiful spring of water flows from the great depths of the range close by, besides an abundance of spruce pine, oak and mesquite for firewood. The sale was brought about and made by E. J. Carter, who recently came here as manager and general director of the Mollie Gibson mine, himself being one of the shareholders. T. J. Grant will be installed as foreman on the new purchase and the tunneling on the ore body already done pushed rapidly.

The other sale, which is only partly consummated, is the Rainbow mine, close by the Lucky Boy. This has been a shipping property and has netted the owner considerable money, but for the past sixteen months has been lying idle, pending this sale. The development from where the ore has been extracted is quite extensive, and no preliminary or dead work will have to be done before taking out ore. The ore is of a high grade shipping character and shows native and ruby silver, the by-products being gold, copper and lead. As in the first sale mentioned, the purchase price will be \$25,000.

New prospects are continually coming in as producing mines as work progresses, and in a group of two claims known as the Mammoth and Madrass, no more astonishing results of what a little development work will do than in the first-mentioned. The two claims belong to Eli Hilty, foreman of the Merrimac mine, and Dan Craig, a miner. The latter has been doing the work on their prospect single-handed, and has run in on the lead about eighty feet and has four feet of ore in almost perpendicular walls. Nothing like these walls has ever before been found or heard of in the entire district, and the ore body is of unknown depth. The ore, which has a vertical depth of about fifty feet from the surface, is at present only a low-grade shipping proposition, but with further development it certainly will prove a record-breaker in its richness and great quantity. The two claims nestle nicely in between the Tennessee, Payroll, Mollie Gibson and other paying mines, and are destined to become as famous as any of those in that great cluster of mines and claims.

Another prospect that is fast coming into public attention is the Redemption, a mill up the mountains from here. This belongs to Robt. J. Ferguson & Sons, and the work consists of an eighty-foot tunnel and a 200-foot shaft now going down near the face of the drift. Here the walls present a fascinating appearance, and they are hardly to be excelled in smoothness and permanence. The ore body, at this depth, is a foot or more in width, from which a shipment was made to the Halsey Sampler at Kingman the past summer with good results. There is much pyrites of iron in the ore, and, in consequence, it gives good percentages in gold and copper, the latter amounting to 22 per The 200-foot shaft is going down exactly on the level, and the ore is being sacked for another shipment as the work is done, which will seek the Denver market.

Weaver gold district, twenty-five miles

northwest of here, is not more agog over its rich gold discoveries in the Virginia and Ramrod mines than over the arrival there of an agent of the Rockefellers of the big Standard Oil Company, who is buying up prospects and employing prospectors to locate claims for them. The recent opening up of rich free-milling gold quartz in these two mines in that district has not only attracted attention and capital from the Rockefellers, but from a number of others with capital to develop good gold claims. Prospectors and miners of less wealth are also filling up the district quite rapidly, and the mountains in that section of Mohave county will doubtless receive an unprecedented season of prospecting during the fall and winter, during which time many new discoveries will be made and opened up.

After a lapse of eighteen years prospecting and development work on the old Hackberry mine in the western part of the county is again resumed. This was, at about that period, and for some time prior, a phenomenal producer of the very richest of silver ore, much of it lying in kidneys of the pure metal.

WASHINGTON.

REPUBLIC, Aug. 12, 1899.

A number of Canadian capitalists, who are heavily interested in the Republic and other mines, were in Republic this week. They visited the camps in the Boundary country before coming to Republic. Their stay here was brief, but they managed to visit and inspect several of the most prominent properties. The other members of the party were Robert Jaffray of the Toronto Globe, a director in the Republic Consolidated Company; Major H. M. Pellett, Mr. Rykert and Ernest Cox of Montreal, son of Senator Cox. All were greatly pleased with the appearance of the mines and predicted a great future for this region, but the gentlemen were not disposed to go into details con-cerning the Republic. They say it is a great mine. From other sources it is learned that the gentlemen were thoroughly impressed with the immensity of the bonanza mine of the camp. They were luckily present when the July clean up was made, and when the gold was finally in sight it is related that Robert Jaffray stood and looked at the rich heap for a moment and then turned and said impressively, "Gentlemen, I have seen many evidences of richness in the mines of the world, but this mine beats the world." The others agreed with him. And Mr. Jaffray is neither an enthusiast nor a tenderfoot. He has been the owner of the Toronto Globe for twenty years and is a man of affairs. He is a frequent visitor in the west, and his interests in mines are large and varied.

In a brief interview with the Spokesman-Review representative Mr. Rykert was abundantly enthusiastic over the riches of the camp and particularly of the Republic mine. He showed a disposition in his talk to disregard the international boundary line and to link the camp more closely with the railways and smelting centers of the Kootenays. He says: "Already we are figuring with W. A. Aldridge, the manager of the Trail smelter, to have some of the Republic ore handled there. These shipments will not be less than 25 tons daily, and will doubtless commence in about three months. Our mill on the Republic is working better than ever and we are saving increased gold values, but with

our rich ores we can well afford to pay freight and smelter charges to get the full gold per-centages. As you know, we are planning to enlarge our mill and Mr. Jacklin of the De Lamar mine, has the task in hand. We mean to work the mine on a much larger scale than ever. From a personal inspection of the property, I can express full satisfaction with the showing which Major Leckie's development is producing."

BRITISH CANADIAN INVESTMENT AND MINING SYNDICATE.

Miscellaneous Mining News.

ALASKA.

The usual batch of conflicting stories comes from the Klondike. It all seems to depend upon the luck of the narrator. If he has picked up a snug sum and got back all right, he paints a rather bright picture; but if his luck bas been against him, he cannot give it too somber a shading. In all mining districts the failures greatly outnumber the successes. That is to be expected as a result of the rush. But in Alaska the unlucky individual encounters not only the ordinary misfortunes which follow in the wake of failure everywhere, but he must deal with a climate of extraordinary rigor, and difficulties of travel that are more generally unknown in more genial climes. However, as long as there is gold to be found there will be men to brave every danger and take every chance in the quest of it.

ARIZONA.

Kingman Items.

Geo. Klemp and Milly Bohne have struck a body of 1300 ounce silver ore on their mine in Todd Basin, Mohave county. They have already been offered a large sum for their property.

The rich strike in the American Flag mine,

at a depth of 90 feet, still continues.

Several more men will be put to work in

the mine next week.

Chas. Gracey is shipping five more stamps to his Klondike mill on the river below Virginia Camp.

W. H. Cushing has opened up a large body of ore in the De La Fontaine mine on Stock-

ton Hill.

Murch Dryden and Morgan Jones have commenced operations on their 200 foot contract in the New London mine.

Dr. Chenoweth and Jesse Grant are erecting a smelter near Magdalena, Cochise county and within a few weeks they will have it in operation.

The Colorado mine, near Yuma, owned by Althee Modesti and Frank Avila, still gives promise of proving a bonanza. Twenty-five men are now at work on the mine and \$6,000 worth of ore will be shipped during this

CALIFORNIA.

AMADOR COUNTY.

Isaac Trumbo, well known in Southern Calfornia on account of his connection with the Golden Cross mines in San Diego county, who took an option on the Grover mine in Amador county in 1895, placed some pumping machinery upon it, pumped out the water

with the hope of finding a rich ore body, and failed to pay for the machinery, was sued and judgment was obtained against him for the sum of \$1,170.36 recently by Gilbert Dobbs, assignee of Knight & Co., of Sutter Creek.

A strong organization has been effected by which it is hoped by the interested parties to bring under one ownership and management the McIntyre, South Spring Hill and its connecting mines, and the Keystone mine, and make of them a gigantic enterprise, to be operated by mining people. The gentlemen interested in the consumation of this deal are very sanguine that it will be completed within a short time, and that work on a scale proportionate to the magnitude of the enterprise will be inaugurated in a short time.

The L. Fernando property, recently bought by some of the people who a few years ago opened up the Baliol mine, is fast assuming the appearance of a mine. Work has already been commenced on a shaft, and designs, plans and construction are under way to equip the property with a gigantic steam hoist. Knight & Co. are planning the machinery to be installed. The work on the mine is in charge of S. R. Porter, who most of the time since its organization superintended the Baliol mine - Amador Ledger.

CALAVERAS COUNTY.

The Farington Gold Mining Co. intends to sink the shaft on the Lone Star mine at Mokelumne, 500 feet deeper, also to commence work on the Woodhouse mine shortly. The Woodhouse is situated on the Middle Fork of the Mokelumue, below Sandy Gulch.

The work of constructing the new compressor building adjoining the Stickle mill at Angels Camp goes steadily on. The largest air compressor ever built in California will be placed in this building as soon as it is com-

The addition to the Lightner mill, near Augels is nearly completed and in a short time forty stamps will be dropping, instead of twenty as at present. The mine is looking first class, and the clean-ups made are encouraging to all concerned.

EL DORADO COUNTY.

Frank Morey, Heury G. Sexton, Albert Pierroz, Hugh Borden, William Yeoman, E. Meier, Henry Niedecker and Wm. McGarth have leased the Blue Bird quartz mine from H. S. Morey for a term of eighteen months. The Blue Bird is an East Belt proposition near Placerville, and has produced in the past some very high grade ore. The mine is well equipped for development work, having a good hoist, ro-stamp mill and necessary buildings.

At the Unity mine near Webber creek, below Granite bill, the tunnel running north is now in a distance of 900 feet. The tunnel will tap the ledge at a depth of over 300 feet.

News was received of the suspension of work at the Gold Note mine on the East Belt, six miles south of Grizzley Flat. It is not known at present the cause of the suspension or how long it will continue. About 70 men were employed at the property. The mine was under the management of Senator E. W. Chapman.

MARIPOSA COUNTY.

Several members of the new company that now own the Mariposa grant have arrived on the grant. The members of the party are Captain Mein, president and manager; Joseph Mooser, secretary, and H. C. Perkins.

The new Board of Directors of the Mariposa Mining and Commercial Company are Captain Thomas Mein, president; H. H. Taylor, vice-presdent; Henry C. Perkins and Mr. Gorham. Joseph H. Mooser is the secretary of the reorganized company. It is stated that the exploration and development of the property will be under the immediate super-vision of President Mein, whose South African and Alaskan mining reputation is worldwide. According to present plans one or two dams will be constructed, and the tunnels in the Josephine, Pine Tree and Princeton mines will be extended on the ore shoots as a starter.

TUOLUMNE COUNTY.

The Mary mine, situated at Arastraville, and owned by Thos. Cook, has been bonded to James Conde. The latter intends to commence erecting a mill on the property at once.

George Wainwright has struck another pocket in the famous Birney mine on Bald Mountain. This time it is said to weigh something over \$3,000. The mine is owned by T. C. Birney, Joel Hudson, Henry Munroe and young Wainwright.

A rich chute of ore has been struck in the east drift of the tunnel level in the Hazel Dell mine near Sonora. The vein is two feet in width, and the extent of the strike can only be determined by further work. Two hundred tons of good ore are now on the dump awaiting treatment at the mill.—Sonora Union Democrat.

Some very rich rock is being taken out of the 11-foot level of the Toledo mine, which is situated southwest of Tuttletown.

The Jubilee Gold Mining Company is working one shift with power drill. The air is such as to not permit longer work. The ore ranges from \$400 to \$1,500 per ton.

COLORADO.

Work has been resumed upon the old Egyptian mine on Quartz hill, at Colorado Springs, under the management of B. S. Phillips of Denver. The property was at one time one of the well known producers of the camp, but was closed down a number of years ago and has been idle since. It was pretty well developed in the past, the shaft having been sunk to a depth of 775 feet, and a number of levels driven east and west. Mr. Phillips is engaged at present in cleaning out and retimbering the shafts and drifts preparatory to actual mining work. This work has been prosecuted to a depth of 400 feet in the shaft and the west level at that depth cleaned out for a distance of over 200 feet.

There is a good plant of machinery on the mine and there is no water in the workings to retard or hinder the work.

The Unexpected, the Tiger, the Happy Year and the Josephine, four well located claims, are formed into a company, through the efforts of Dr. D. T. Sill. The new com-pany will be incorporated in Denver, with a capitalization of 1,500,000 shares, of which 500,000 shares will be treasury stock. The properties comprise twenty-five acres of land, and are located on the saddle between Raven hill and Bull hill, in Cripple Creek, and about 1,000 feet from the John A. Logan property.

The Sheriff vein runs through the Unexpected. A tunnel cuts one of the properties for 600 feet. There has never been much heavy development work on the claims. They are valued at from \$100,000 to \$150,000.

The Saw Pit Gold Company, whose properties are located in the Saw Pit district, Ouray Co., has recently placed an order for a new mill.

The Monongahela in the Sneffels district, Ouray Co., is working about twenty-five men and is making weekly shipments of some very rich ore, averaging from \$100 to \$125 per ton.

The Governor, a new mine recently opened above the Revenue mill, in Ouray Co., gives promise of becoming one of the big mines of the district. It is strictly a gold proposition, and the mineral is found in pockets.

Edsall, Key & Co. hought a half interest in the Little May claim, on the south slope of Ironclad hill, Cripple Creek district. The property was sold by J. C. McCoy, W. S. Montgomery and J. S. Osborn. The claim has been held at \$15,000. The property is near Humboldt, and its location is one that must scon come to the front as one of the best parts of the district. The price paid was \$5,500.

Incorporated.

The Denver Smelting and Mining Company; capital stock \$1,000,000; to operate in Arapahoe and other counties; incorporators, H. M. Joralmon and Frank W. Crocker, Denver; Nathaniel Tucker, New York; Thomas Scattergood, Philadelphia, and Irving Champlin, Providence, are interested.

IDAHO.

A Big Strike on Badger,

One of the biggest quartz discoveries in the history of the state has been made on Badger creek, which empties into the Boise river, about three miles this side of Twin Springs.

The discovery was made by a prospector named Frank Bryan, at a point on the creek three miles from its mouth.

News of the strike reached Boise and created a distinct sensation in mining circles. A large number of people at once struck out for the scene of the new discovery, others will go.

It is understood that R. J. Anderson, manager of the Twin Springs Company, has taken options on thirteen of the claims for this company, which embrace the best locations.

He has had ten assays made, which run all the way from \$17 to \$133,000 a tou.

One pound of ore from the original discovery yielded \$30 in gold.

The new discovery is only about forty miles

The new discovery is only about forty miles from Boise. By this time a swarm of people who heard the news are on the ground.

The important discovery covers two veins, which are about six feet wide at the surface and only 300 feet apart, running east and west.

In the south vein the gold predominates, and from it the most of the samples were taken for assay.

In the north vein silver predominates, but it also carries a large percentage of lead. The assays show an average value of 30 per cent lead and fifty onnces of silver to the ton.

It is the gold vein, however, that has caused the sensation.

Thirty dollars in gold from one pound of

ore is enough to turn the head of the most conservative operators, and the rush to the new discovery is not to be wondered at

Those who got in on the ground floor are very reticent, and the people will have to wait for details until the crowd that rushed to the new field returns to the city.

MICHIGAN.

The shaft at the Valley property is now free of water for depth of zoo feet. Arrangements are now being made for the crosscutting to the north of the two-hundred level, and this work will begin next week. Pumping will be continued until the water is all out of the shaft. The valley is splendidly located, and the finding of a body of ore on the property would prove a big thing for the city of Besseuer, Gogebie Co.

Explorations at Adams mine, Mesabi range, Marquette county, are finding the mine much larger than was to have been hoped, the ore extending far to the north under the Taconite, and there seems no reason why such extensions should not be a common occurrence of that range.

One Mesabi mine that has been generally regarded as a small property is now working not far from 600 men, and is sending out two trains of ore daily of a very high grade. This is the Commodore, and it is shipping a better ore than at any time in its history. It goes to Corrigan, McKinney & Co, and the Cleveland Storage Company.

Republic Iron & Steel Co.'s mines are not yet being operated as heavily as had been hoped, largely on account of the lack of men, and their product this year will be of small importance, not over 100,000 tons.—Iron Ore.

MINNESOTA.

A Zinc Mine.

There doesn't seem to be any end to the mineral riches of the north shore of Lake Superior. Gold and silver, lead and copper, iron of all kinds, are in profusion, and now it is zinc, and the richest and finest to be found on the American continent, besides which the mines of Joplin are poor. What is undoubtedly the richest zinc mine, so far opened, in North America has just been sold for \$254,-000. It is on the north shore of the lake, was opened last fall, and has been shipping 55 to 60 per cent zinc since at the rate of 300 tons per month. When opened there was no road to the mine, no opening on the property, no settlement near; but the zinc rose from the surface in a great cliff and could be quarried like rock, and the results achieved since then show what the deposit is like. Lake Super ior and the Canadian Pacific roads are but twelve miles away, and teams have been employed to haul the ore to the road, whence it has been shipped to Belgium for sale. The property originally belonged to the Huters of Duluth and McKellar of Fort William, and for years they have tried to sell it to leading zine consumers at a price that would now seem ridiculously low. Last fall they finally sold the property to a few Ottawa men.

A few days ago a vein of pure zinc, 600 feet long and twenty four feet wide, was discovered on the property, and its sale followed to heavy parties in the east. The new owners have stopped shipments and are building a road to the Canadian Pacific at Rossport.

This will be done in the fall, when it is expected they will have 70,000 tons of the richest ore ever shipped ready for the smelters. The work of mining is mere quarrying, and can be done at a trifling cost. The expectation is to ship all the ore the market will take, and there is probably a great fortune in the mine.

MISSOURI.

Joplin Ore Market.

The week just closed was a satisfactory one for producers, and there was a large output, considering that most of the mills in the district have taken off night shifts, in response to a request from the directors of the Producers' Association. Every pound of ore for sale was bought, and in all cases buyers paid the Association price. In many cases, from the demand for high grade ore, buyers went above the scale, 3 cars of Oronogo ore selling at \$45 per ton, and several cars of Joplin ore bringing \$44 per ton, while a very large amount sold at \$43. Lead sold throughout the week at \$27.50 per 1,000, as for weeks past.

The Dayton tract of 240 acres at Aurora was sold last week to Illinois parties for \$42,000, and \$8,000 will be spent in development work at once. Hugh McIndoe has sold his interest in the Pilot mill at Galena to Charles Haney, but he and William Chew still retain a controlling interest in the valuable 9 acres lease. The Monarch mine and lease of 10 acres, on the Leonard land west of Joplin, was reported sold this week to New York parties for \$50,000, but the report is not credited. A 34 interest in the Davis-Hart mine and lease of 20 acres was sold for \$48,000 to Taylorville, Ill., people. The Webster Reality Company and O. T. Hafford have purchased a 7-12 interest in Delaware lease, mines and machinery, and will overhaul the machinery and start the mill again in about 6 weeks.

MONTANA.

A number of bullion shipments are reported in Philippsburg, Granite county, including one of three bars from the Hope, the result of the clear-up prior to the shut down, two of three bars each from a week's run of the Sweet Home mill on Cuno ore, of 67 bars, weighing 150 pounds each, by the Granite Company.

The Upper Ten, the Leap Year, the Forest Rose, the Crimmons property and the Irene, in the Dunkleberg district, are all reported as looking well. A carload of rich ore is said to have just been shipped from the Irene. The copper property of J. D. Rhodes, near Sunrise, is said to give assays running 30 per cent in copper, with a considerable quantity of ore ready for shipment.

Among the shipments to the smelter last week from up the valley at Twin Bridges, in Madison county, was one consisting of 15 tons from the U. S. Grant. This proposition is in Alder gulch, and, if reports are true, it is a fortune for the owner, John King. It is claimed that some 12,000 tons of ore are in sight that are worth \$20 per ton.

Lon Planalp has returned home from Butte, where he went with a shipment of ore consisting of two carloads. The ore was valued at \$100 per ton, and came from the Noble

mine, on the east fork of Wisconsin creek. Mr. Planalp and his brother, Ed, have been leasing on this property for several years and the rich ore is still being extracted.

The work of retimbering the Parrot shaft, at Butte, which has been in progress for some time, is now nearly complete, and shipment of ore will soon begin. It is supposed that the ore will be treated at Anaconda.

The mining experts engaged in the Rarus-Pennsylvania suit, in Butte, are as busy as bees. A large portion of their time is spent below ground examining the disputed lodes, making surveys, etc. When starting for the mines or returning therefrom, it would be a difficult matter to distinguish the expert from the common miner, so far as dress is concerned. If some of Clarence S. King's eastern friends were to run up against him in the streets of Butte something in the way of an introduction would be necessary. If these gentlemen know as much about mining geology as they do of how to adjust themselves to western customs, they are all right.

NEVADA.

C. L. Roe has sold his interest in the Vesuvius mine, near Bristol, to Addison Byhee. We are informed the price was \$10,000. Mr. Bybee has also bonded the Challenge mine from Mrs. McFadden for \$20,000. This mine has a large body of low-grade lead, as well as a good percentage of copper, and the development that is going on at present gives every indication of the Challenge mine turning to copper in depth, as it is proved by other mines in the vicinity that at depth the silver and lead ores are only formed in the cross veins and where the main copper fissures in contact with the cross veins.

There are now 30 men at work in the old camp, and development work is proceeding nicely on all the claims. Out of eight claims being worked, all are producing copper ore that runs from 25 to 40 per cent, first class; second class, from 9 to 17 per cent copper.

NEW MEXICO.

Mose Adams and J. C. Plemmons have struck a large body of 450 oz. ore on the Palomas Chief, near Hermosa.

The Modoc mine, situated about 12 miles east of Las Cruces, Dona Ana, in the foothills of the Organ mountains, was lately sold by Mrs. J. J. Rynerson to Wm. B. Haden for \$15,000. Messrs. Haden, R. Y. Anderson, Col. Dunbar and W. R. McCormick are interested in the deal. It is understood that Mr. McCormick, who has been in Chicago for some time, has negotiated a deal with the Leiters, and they will operate the mine. Another deal. Wm. B. Hayden also sold a one-third interest in the Torpedo mine and one-eighth interest in the Excelsior to R. Y. Anderson and Col. Dunbar for \$11,000. Both these mines are in the Organs, on the west side of the pass.

T. B. Atwood is coming into some fine ore on the Rattler mine, at Hanover, Grant Co., recently purchased by R. J. McKinney, of Colorado Springs. The extent of the strike is not yet fully known, but in all probability it will prove to be a big thing, as the vein is a large one and carries sulphide and native in considerable quantity. The ore was found in old workings, opened by a drift from a 30-foot shaft. Two men are employed, but others will be put on soon.

OREGON.

Last week 2,500 pounds of ore was shipped to Gold Hill from the Gold King mine, in the dry Diggings district, Josephine Co., from which the owners received \$21.

Cyrus Messenger has lately leased his quartz property, the Rising Star, near Grant's Pass, to two Tacoma parties, who have had two shifts of men at work for the past two weeks.

John C. Taylor, one of the owners of the Lost Flat mine, was in Grant's Pass from Galice. From him it was learned they were running a tunnel in their property and are now in some 115 feet.

The Virtue Consolidated mines filed second supplementary articles of incorporation in the Secretary of State's office, increasing the capital stock to \$2,000,000 The office of the corporation is in Baker City.

F. J. Mouroe, of the Morgan and Mouroe syndicate, which recently purchased the extensive property of the big Applegate Ditch Company, near Applegate, who was in Ashlaud, reported that he had just let the contract for a one mile extension of the big ditch, which has a capacity of 7,000 inches of water, which is taken from the big Applegate and the Carberry fork, and which already extends six miles, covering a large amount of valuable placer ground controlled by the company which is now installing one hydraulic plant, with two six inch giants, and will install others later

SOUTH DAKOTA.

Harris Franklin, vice-president of the Golden Reward Company, has announced that the price for treating ore at the D. & D. smelter, which is now owned by this company, will be \$8.50 a ton for all ore containing 75 per cent silica, no matter what the value of the ore may be, and 90 per cent of the silver will also be given. The smelter's chlorination plant is treating about 425 tons of ore per day, and the payroll of the company now figures up to about \$50,000 a month. The price for smelting ore has been raised about 50 cents per ton, which was made necessary on account of the raise in the price of copper and coke. This raise in price has caused the shutting down of the Portland and Clinton mines, in the Portland mining district, and the letting out of a good many miners, but Harris Franklin asserts that there will be very few men out of employment since it will be necessary for his company to put on extra men in its mines in the Bald Mountain district, to keep the smelter and chlorinating plant running at full capacity. The Portland companies were shipping about 150 tons of ore per day. It is expected that the companies in question will erect an ore treating plant of their own this season. The Golden Reward Company has started up several old mines in the Bald Mountain district, the ore going to the smelter .- Black Hills Mining

UTAH.

The Silver Apex Mining Company, whose property lles just south of the Centennial Eureka mine in Tintic is actively pushing development work. A contract having been let to Louis Gatewood to run a 200-foot tunnel. The company is in good financial circumstances and has a splendid showing on

their property. Last night closed a deal hy which all of the treasury stock was sold, some 76,000 shares, to Dr. Fred Staufer our mayor, and Ezra Rich of Ogden. We look for good results from this exceptionally good property.

—Juab County Republican.

Assays of ore from the Tetro tunnel are reported to show large values, upon the strength of which the price of stock advanced rapidly. The striking of ore in the Tetro would mean to Eureka an increase of hundreds of thousands of dollars in the way of immediate development of the virgin ground, lying between that ground and the great Mammoth mine on the other side of the mountain.

Articles of incorporation of the North Mammoth Mining Co, were filed last week with Salt Lake county clerk. The capital stock is \$300,000, divided into 300,000 shares, of the par value of \$1 each. J. D. Wood is president, W. M. Bradley vice-president; Josiah Barnett secretary and treasurer; who, with J. D. Wood, Balthazar Christensen and A. Hanauer, form the directors.

The property of the company consists of the Jason and Medea mining claims in the Tintic district.

WASHINGTON.

The Fifteenth Payment.

The Deer Trail No. 2 Mining Company, August 11th, declared dividend number 15, for \$2500, to be paid August 25 to stockholders of record August 21. The payment is made a little later in the month than usual, because the company has found a little more time necessary to do the office work connected with the payment of a dividend. As the stock of the company is now largely held in eastern Canada the company will arrange to accommodate its eastern shareholders by making its checks payable through the Bank of Montreal, thereby obviating the necessity of paying exchange, as is the case when checks on Spokane banks are sent so far east.

The Deer Trail No. 2 mine, at Republic Camp, will have paid \$37,500 in dividends under the management of the present company when this division of profits has been made. The dividends come along regularly on the second Thursday of each month. The amount paid is not large, but when it is considered that it represents but the shipment of two or three cars of ore per month while the mine is being developed, the steady profit paying becomes remarkable.

The mine has large ore reserves blocked out with which much larger dividends will be paid when better transportation facilities are provided.

FOREIGN MINING NEWS

BRITISH COLUMBIA.

Fort Steele News.

J. Houghton, manager of the Sullivan mines, says an important strike was made in the Hope, one of the claims of the company. In stripping the ledge, to feet of lead carbonates and galena was uncovered. Mr. Houghton says it is the finest appearing ore yet encountered on the property, and can be mined at a minimum of expense.

The No. 2 shaft, started July 14, is now down 300 feet in solid ore. The property,

said Mr. Houghton, never appeared as well as it does now. The Gem, one of the claims of the Gem and Stoney Mining Company, on Sullivan Hill, is looking exceedingly well. The bottom of the shaft is in solid ore. The Lewis Creek Mining Company of Spokane has taken up the bond on the Minnie M. and Tiger claims.

The Little Phil is shipping 40 tons of ore daily from Ainsworth.

There are 50 men employed on the No. 1 mine, Ainsworth. This property is shipping regularly.

Hennessy brothers are reported to have bonded their property on Sixteen Mile creek for \$300,000.

The Rockland, on Four Mile creek, has a 42-foot lead of gold-copper ore. A tunnel has been started to tap the vein.

The compressor will be in working order in a couple of weeks on the Highlander, near Ainsworth. The tunnel is now in about 100 feet.—Kaslo Koolenian.

MEXICO.

A Famous Mine.

Mr. William B Brooks, a prominent mining man of Chihuahua, is in the City of Mexico and will remain there for a week or so. Mr. Brooks is the possessor of several promising silver and gold properties near Jesus Maria and Pinos Altos, one of which will be opened up within a couple of months.

"The chief object of my visit here is the recurrent of my health and to spend a few days at the capital but make in the City of

"The chief object of my visit here is the recuperation of my health and to spend a few days at the capital, but while in the City of Mexico, I shall arrange for the shipment of all machinery necessary for the immediate development of one of my properties near Jesus Maria. This district in the Sierra Madre is holding its own, and it will be gratifying to mining men acquainted with the history of the property to learn that the famous Santa Eduviges mine, near Pinos Altos, has again been started up and promises for

the second time to become a bonanza.

"The Santa Eduviges is the mine in which Ex-Senator John Tabor was interested some years ago. It has produced in its time over \$44,000,000 worth of silver, but, like many other old Mexican mines, was supposed to have been worked out, and was abandoned by its recent owners. Lately, however, a vein yielding an average of \$50 per ton and a large quantity of ore was struck, and a forty stamp mill erected. The mill has been running about five weeks, ten stamps only being in operation, and the first month's output was \$40,000 worth of bullion, which was brought into Chihuhua on the 8th of the past month by Don Joaquin Chavez, the conductor to the Sierra Madre. The Pinos Altos, El Concheno, the San Jose (better known as John Watterson's property) El Refugio and Saguayacan mines sent in the usual amount of bullion."

"Within the past two months there have been many new arrivals from the United States to Chihuahua, most of whom have come for the purpose of investment. A large number of these are from Colorado. While in Denver, two months ago, I could not but notice the great interest being taken in Colorado in the development of Mexico."

"The Chihuahua and Pacific expects to xtend its transportation facilities to a point

15 or 20 kilometers beyond Santa Isabel, up to which point business is now carried on. They are grading gradually toward Guer rero."—Mexican Herald.

Messrs. Julian Johnson & Sons have made a definite contract with a heavy American syndcate for the sale of the big coal deposit at San Marcial.

In the Cajon de Amarillas mine, in the Altar district, about sixty miles southwest of Llano station, Mr. A. Bray is doing work on an extensive scale. He has put up a large hoist with a capacity of going down one thousand feet, has erected substantial buildings for employees, and is putting things in condition for exploring the mine on a very extensive scale.

GENERAL NEWS.

SAMPLING PLACER DEPOSITS.

(BY EDMUND B. KIRBY.)
[Continued from our Issue of July 15th, 1899.]

Notes on Test Workings in Water-Bearing Gravel .- Drop drill holes are valuable and generally necessary as a preliminary to the expensive work of shafts and drifts. They cannot, however, take the place of such work. Drill-holes will furnish a cross-section profile of the bedrock and thus indicate the most probable location of the channel. They will also show the presence of large stones and boulders in serious quantities, the existence of quicksand layers, etc. If gold is present it will be brought up in the sand pump. A failure to find gold in the sand raised may be evidence decisive enough to stop further operations, but the presence of gold, on the contrary, is not by any means decisive evidence. While drilling, the stones for a greater or less distance around the hole are churned and shaken. The finer and richer material in their interstices works loose and flows into the bottom of the hole so that the gold brought up by the sand pump is largely derived from this adjacent gravel. Hence it is impossible to say what volume of gravel has yielded the gold recovered, and any figures of value per cubic yard, based upon drill-hole results, is pure guess-work. Nothing could be more dangerous than to base a heavy investment upon such data.

The cost of drill holes in unknown gravel cannot be estimated closely. In favorable gravel, drilling is very rapid and cheap, but an abundance of large stones may make the work expensive, and cause the loss of many holes. The money thus spent, however, may accomplish its purpose in showing that the gravel bed is of such a character that it cannot be mined at a reasonable expense. Under the average western conditions, the total contract cost of such work will generally range from \$3 to \$6 per foot of hole.

In these deposits there is no way to ascertain the structure of the pay gravel and its approximate contents, except by shafts and drifts. The depth of gravel does not usually exceed 40 to 70 feet, and much sand and small gravel must be raised with the water. A vertical centrifugal pump is, therefore, the best means of handling the flow. In one typical instance of quite open gravel, the flow reached a maximum of about 1,800 gallons per minute, while sinking a 50-foot shaft. A few weeks of steady pumping, however, reduced this to 500 gallons. The extension of drifts increases the flow, but long-continued draining has a remarkable effect in reducing it. A stream flowing over such a gravel bed

seems to pack the interstices of its channel with fine silt and it does not furnish water to the drained area so rapidly as might be expected.

Steam power will generally be found best' because of the temporary nature of the work and the ease with which it may be moved from one shaft to another. Water-power saves a severe daily expense, but requires a heavier first cost and cannot be moved. It is also very difficult to adjust turbines to the increased power and speed required by the pump as the depth increases. The usual heavy cost of such work is almost invariably due to stoppages and breakdowns, and the most careful planning is necessary to reduce these to a minimum. The pump and stand pipe are best supported by an independent framework which can at any time be lifted out of the shaft. The pump shaft is driven by a quarter-twist belt, governed by an idler pulley which will permit the shaft to be lowered four feet before shifting its pulley.

The two standard methods available for work of this kind are to sink by driving lagging or to sink a caisson. With either method the shaft is apt to become distorted. Both are slow, and a caisson makes it very difficult to arrange the pumping plant. The method of driving lagging does not work well in coarse gravel, or where layers of large stone are present; hence in most cases, the following plan will be found best:

The gravel along each wall of the shaft is excavated in the form of a small trench, and the space is packed with brush. A tilted cribbing plank, 2 by 6 inches, is used to hold the brush in place, and is finally forced into position so as to form a continuation of the outer cribbing. This is held temporarily by a few 1-inch boards nailed on and braced as required, until a depth of four feet is gained all around, and another set of regular shaft timbers can be placed. A lagging of 1-inch boards extending between the two sets is then nailed on the cribbing. A shaft was sunk in this way, by skilled workmen, 47 feet in 29 shifts of 10 hours. The waterflow was 500 to 800 gallons per minute, but no quicksand, and few large stones were encountered.

In drifting it is necessary to use the standard methods, with driven lagging and breast boards. 2-inch lagging is generally used overhead and in the corners, and 1-inch boards at the sides and breast. This top lagging will often be found too light for the weight, and its bending causes delay and distortion of the work. In such cases selected 3-inch lumber should be used.

In general, it may be said, that, excluding stoppages, a shaft may be sunk at the rate of 1½ feet per 10-hour shift. Drifting should maintain an average of 1¾ feet per 10-hour shift. The main expense is due to stoppages, the cost of the plant, and the cost of bringing in skilled workmen for a temporary job.

In work of this kind the heavy wat erflow

In work of this kind the heavy wat erflow makes it almost impossible to take accurate measures or samples. Most of the fine sand and gravel will pass out through the centrifugal pump, and may be put through the testing sluice. This, as well as the large stones, is apt to drop its gold on being loosened in the shaft bottom. The heavy waterflow also washes out all fine gravel from the sides before it can be observed. It is, therefore, necessary to rely mainly upon panning and judgment during the progress of the work. After the ground has been drained for a time it becomes possible to sample any special layers of the gravel.

THE SELF-COOLING CONDENSER.

(BY THOMAS L. WILKINSON.)

In a letter Mr. Vail further states:

'It may be of interest to the meeting, in connection with the subject of my paper, to learn that a few days ago the 750 horse power condensing engine, referred to therein, was operated at half load for four or five hours, at which time the fans in the cooling tower tower were not in operation—the atmospheric temperature being from 38 to 40 degrees. We were able to carry a vacuum on the con-denser of 26 inches. The heated injection water was pumped from the condenser to the tower at a temperature of 116 degrees, and after passing through the cooling tower was reduced to a temperature of 90 degrees. This we find is about the limit of load for the cooling tower when the fans are not in use.

The cooling tower with an ordinary pump, instead of a condenser, might be used with

profit, I think, in another way.

Smelting works use large quantities of water in the cooling of the furnace jackets, and unless the supply is unlimited and cheap, considerable expense is attached. The water, after doing the work of cooling the jackets and absorbing the heat, could easily be pumped into one of these cooling towers and used over again.

In this case additions to the supply would be necessary to make up for the quantity of

water evaporated in the tower.

This system of condensing has become so successful that its adoption after the experimental stage has been very rapid, especially in the east, where everything in nature of a reduction of the cost of production is most eagerly sought after. This system is superior to the condenser, which is dependent on a natural water supply, especially, when the engines are subject to great variation in load. Many of the condensers, on natural water supply, have to lift the injection water at least 16 feet, and many higher. And this results that, in case of an overload on the engine when the steam is admitted a greater part of the stroke, the condenser is unable to maintain the normal vacuum. Or the vacuum may be entirely broken and the engine must be run non-condensing, or the condenser cooled off and started again by forced injection from an outside source. This may be appreciated in an electric railway station. this case, the load diagram will show the tallest peak between 6 and 8 o'clock in the evening, and trouble at this time would be serious when the engines are carrying their heaviest

In the case of the self-cooling condenser, the lift is never but a few feet and the vacuum never broken.

Colorado, with its increasing tendency to manufacturing, to say nothing of the power plants in connection with mining and smelting, surely should be on the watch for all appliances which necessarily must reduce costs and increase profits. This climate is well adapted to the self-cooling condensing system, on account of its dryness, and also equally well adapted on account of its limited supply of water for condensing purposes.

In a way, it is like irrigation-more to be

depended on than rain.

For guy ropes, stays, etc., galvanized ropes are superior, but galvanized ropes should not be employed for hoisting in mines, as the coating of zine soon cracks off, and the corresion of the iron following quickly, they become dangerous.

RELATION OF MINING TO FORESTRY.*

(BY O. S. BREESE.)

It is with some misgiving that I have assented to expressing my views on this important subject before a body of gentlemen, who, I am confident, understand it much better than I do, and on completion of this paper I shall be pleased to listen to a discussion of the subject, and hear the views of the older and more experienced members.

The question of Forestry has an important bearing upon the mining interests of any mineral-bearing country; but especially is this the case where by far the largest part of the mining area is either destitute of timber or has a very limited supply, and where, as in the case of desert mines, the water required for mining and kindred purposes, has to be derived from the higher and timbered regions. Large quantities of timber are required in the timbering of mines, as the ore is being extracted, and for other important uses in conducting mining operations, also for fuel in the reduction of ores. Water is absolutely indispensable, in the treatment of any and all kinds of ores.

Many an experienced prospector has staked a valuable claim on the desert and regretfully turned his back upon it, because of the absence of these indispensables to profitable exploitation—timber and water. And deposits in such claims will only become available and profitable when water and timber are available, either through better means of transportation, or through the growing and preservation of Forests and the conservation of the water supply; and the latter is indisputably conceded to be directly dependent upon the former. The more Forest, the more water, and vice versa.

The mining industry, therefore, has a deep and permanent interest in Forestry. The mining interests of the mountains and the deserts, and the farming interests in the valleys demand alike that the annual rainfall be stored for future use-the timbered forests subserve this purpose better than any other means. It is a well known fact that by the planting of forests the rainfall has been materially increased in sections of desert country.

Of the forest reservations in California, nearly one half are in the southern part of the state, the other half being in the central. The San Gabriel, San Bernardino, Trabuca, San Jacinto, and the Pine Mountain and Zaca Lake Reservations, containing 3,781,794 acres, are all in Southern California, while the Stanislaus, Sierra, and Taboe Reservations, comprising 5,155,840 acres, are located in the central part of the state, making a total of 8,937,634 acres in California.

On March 1st, 1898, the lands embraced in the Stanislaus and San Jacinto Forest Reservations, which were suspended by act of June 4th, 1897, again became subject to the pro-clamation of February 22nd, 1897, creating them, which added an estimated amount of 1,428,480 acres to the area embraced in the government forest reservations of California previously created. In addition to this, the Pine Mountain and Zaca Lake Reserve, containing 1,644.594 acres, was also created, as well as an addition made to the Trabuca Re-

serve of nearly 57,200.

The efforts of the government the past year and a half have been primarily directed to putting in operation the act passed June 4th, 1897, providing for the administration and regulation of forest reservations, but the ne-

*A paper read before the American Forestry Association, in Convention, at Los Angeles, Cal., July 10th and 20th.

cessary funds were not appropriated by the government to put the system in operation till July, 1898, since which time a force of graded officers were placed in control of the reserves. Through the patrolling of the forests, it has been found that forest fires con-stitute the paramount danger to which the reserves are exposed. During the month of October, 1898, an extensive forest fire raged in that part of the Los Angeles County reservation, situated between Strawberry Mountain, on the west, and Barley Flats, on the east, along the south slope of the Big Tejunga water shed, which resulted in the destruction of many square miles of valuable pine timber.

Fires originate chiefly by campers lighting fires for cooking purposes, and neglecting to extinguish them. Subsequently a wind arises, wafts the smouldering embers into a blazing and devastating fire; and a loss occurs that cannot be repaired except through a long

term of years.

There is something conspicuously wanting in our Forest Reservation Inspection. When funds have been needed for a more thorough patrolling, for the prosecution of sheep herders, and other trespassers, and for other like purposes, the inspector has found himself powerless to act for want of funds.

Numerous provisions and regulations are necessary in the proper maintenance of reserves, and the subject has been treated upon on different occasions, but from the stand-point of the miner, little has been done. It is true certain regulations have been passed, permitting the miners to enter upon these reserves, prospect for, and locate minerals; but nothing has been done to encourage mining upon them. The construction of mountain trails would open up a large territory to the tourist and health seeker, in the heart of our grand mountain and forest scenery, in parts now only known to the venturesome hunter and hardy prospector, who have heretofore been the pioneers in this work.

The opening up of new territory to the efforts of the miner and prospector is the most desirable end to be accomplished. The efforts of the forest rangers would be best aided in protecting such reserves from destruction by fire by the extensive construction of trails through the mountains, to enable them to get to the scene of labor, and facilitate the work of bringing in their supplies.

To further protect the forest, the entrance could be guarded by the forest ranger stationed there, whose duty would be to grant a permit to all parties entering the reserve for prospecting, mining, hunting or health as the case might be. By making it compulsory on all entering the reserve to first obtain a permit from the forest ranger, and making all persons found without it liable to prosecution and fine, a check would be kept so that the origin of a forest fire could be traced to its beginning, when the forest ranger knows the parties who were camped in that part of the

THE MINING AND METALLURGICAL JOUR-NAL, under date of July 1st, 1899, published the following editorial, which conveys some suggestions:

"The natural subdivision of the land of any civivilized country is best classified under the headings of agricultural, timber and mining rights. Until very recent years, the government of the United States has left the care of the timber and mining resources to the destructive and improvident trust of individual ownership. The result is that, on account of the perishable nature of the timber supply and its slow rate of reproduction, the

required amount has rapidly vanished, and in many sections is gone altogether. The effect of this has been felt on the climate of the country, in diminishing the rainfall and making the amount of it that did come find its way to the rivers and streams in a shorter space of time, and, in consequence, that moisture which fell was not retained in the soil and rocks, and has rendered some sections, such as the Southwestern States, more arid than it was formerly. For these reasons, the timber area of the country has an important bearing on the development of the mining resources of any district. There are large sections of the Southwest that at one time were covered with timber which was de stroyed by cattlemen and sheepmen, and at times by the miners, as the government took no interest in forestry in those days. This destruction took place both in the mountains and what is now called the desert. Forest reserves have been fortunately set apart on the mountain sections, but that act does not now prohibit prospecting or mining within

the limits of such reserves. The restoration or reforesting of the burnt forest areas in mountain and desert sections has an important bearing on the water sup ply and aids mining in such sections. In the desert country there have been valuable groves of mesquite timber which have been destroyed as above stated, and efforts should be made by each county to reforest or replant such places. The mesquite timber has several varieties, and grows on the desert in Arizona and California from the sea level along the valleys of the Colorado, Salt and Gila rivers to an elevation of 2,900 feet, as at Newberry, Cal., on the A. & P. R. R., Santa Fe Route, where there was at one time a large grove, which was cut down to supply fuel for the silver mines in Calico, when our laws permitted our miners to indulge in the luxury of mining silver ore. So far as known no effort has been made by our experimental stations to grow this valuable cattle food and fuel-producing tree. The pods of this tree have a taste similar to sweet corn, and seem to ripen at all seasons of the year, and furnish food in the Arizona and California desert valley sections for the Indians as well as for cattle and horses. The presence of excessive alkali does not apparently kill the tree, and it seems to flourish where nothing else would grow that cattle would subsist on and get fat. Professor Wickson, of Berkely, is authority for the statement that the date palm will subsist on moist alkali soil, and that salt is the proper fertilizer for this tree. If this statement is true, there are large areas in the desert where alkali and salt water and moist land are found, and where experimental trials could be made with these two representatives of native and foreign desert trees. To increase the area of forests would make such sections fit for habitation, and open up settlements in the districts where minerals could be made available. The addition of any valuable tree from the interior or inland sections of Australia might have as good results to our desert sections as the introduction of the ecalyptus family has been to the coast districts of California."

I desire, in conclusion, to extend to this body the hearty co-operation and well wishes of the California Miners' Association in the most excellent work that you have undertaken.

It is said by the owners that the Bonanza mine at Sonora, Cal., produced over \$360,000 from a single pocket.

Latest Mining Decisions.

Prepared by Andrews & Murdoch, Berrien Springs, Mich.

A notice, posted by the locator of a claim, that he claims 1,500 feet on a lode, will be construed to limit his claim to 750 feet along the lode on either side of the point of discovery. Bramlett et al. vs. Flick et al., 57 Pac. Rep. (Mont.) 869.

Where one enters upon the mining claim of another under claim of title thereto, and mines thereon, and warns such other not to mine thereon, such conduct amounts to an ouster from the territory of the latter claimed by the former. Bramlett et al. vs. Flick et al., 57 Pac. Rep. (Mont.) 869.

Where one mining claim encroaches upon another, it is not error to permit the engineer, who has made a plat thereof, to point out the exterior boundaries of the encroaching claim, as it tends to enlighten the jury as to the controversy. Bramlett et al. vs. Flick et al., 57 Pac. Rep. (Mont.) 869.

A notice of location of a mining claim, which, by reference to natural objects and monuments erected by the locator, contains directions which, taken in connection with such objects, would enable a person of ordi-nary intelligence to find the claim and trace its boundaries, is sufficient. Bramlett et al., vs. Flick et al., 57 Pac. Rep. (Mont.) 869.

A question as to whether a practical surveyor, familiar with the methods of locating claims, and familiar with surveys in mountainous countries and with the neighborhood, could take the description in a notice of location of a claim, and, starting at the point of discovery, find the claim described therein, is incompetent, as calling for an opinion. Bramlett et al. vs Flick et al., 57 Pac. Rep. (Mout.) 869.

The law of mining partnerships, as declared by the courts or by the statutes of Idaho, does not entitle a mining partner to a lien on the product of a mine for his share of past profits made by his partners while he was excluded from the property, as against a mort-gagee of the interests of such partners, although he will be entitled to his share of the product while the mine is operated by a receiver appointed in a suit to foreclose the mortgage. G. W. B. Min. Co. vs. First Nat. Bank of Hailey (Brown et al., Interveners), 95 Fed. Rep. (U. S.) 35.

In an action to determine the boundaries of conflicting mining claims evidence as to whether or not a surveyor found the boundaries of a claim without assistance, whether the blazing upon posts appeared to be old or new, and whether he could readily find the blazes on the trees along the boundaries, and whether they could be traced from one to another, relates to matters of fact, and is not open to the objection of being opinion evidence. Bramlett et al. vs. Flick et al., 57 Pac. Rep. (Mont.) 869.

One who leases mining property from a corporation with full knowledge of a prior mortgage thereon, which is contested by the corporation, takes subject to all rights of the mortgagee; and, where the validity of the mortgage is sustained, he is not entitled to claim the proceeds of the mines while oper-ated by a receiver appointed in a foreclosure suit, as against the mortgagee, on the ground that he expended money to render them productive. G. W. B. Min. Co. vs. First Nat. Bank of Hailey (Brown et al., Interveners), 95 Fed. Rep. (U. S.) 35.

In an action to determine adverse claims to a mining claim, a notice of location which de scribed a claim as being situated in a certain county, a certain distance from another claim, county, a certain distance from another claim, and defined by courses marked by substantial monuments, readily identified by marks thereon, taken in connection with evidence that the locator discovered gold-hearing quartz, and made a monument at the place of discovery, upon which he posted his notice of claim, shows prima facie ownership of such claim. Bramlett et al. vs. Flick et al., 37 Pac. Rep. (Mont.) 869

Under Comp. St. div. 5, § 1477, which provides that the discoverer of a mining claim shall have 20 days in which to complete the location and make the necessary record, a discoverer who posted in plain view a notice of location, and "claim of 1,500 feet on this lead, with 20 days for prospecting," if he made it in good faith, and with an intention to complete his location within the prescribed 20 days, thereby acquired a right to all the ground along the lead legitimately covered by his notice; and one locating thereon subsequently to such notice, and prior to the expiration of the 20 days, does not acquire a superior title, though he filed his statement and record within 20 days, and the former did not. Bramlett et al. vs. Flick et al., 57 Pac. Rep. (Mont.) 869.

PERSONAL NEWS ITEMS

R. H. TERHUNE, consulting engineer to the North West Copper Co, has recently returned to Salt Lake City, Utah, after spending three weeks in the Seven Devila District, Idaho.

O. O. HOWARD, jr., of San Prancisco, Cal., is in Los Angeles, Cal., on mining business

MRSSRS. McCALLUM, MURRAY, JOHNSTON & DAY, the four directors of the Detroit and Deadwood Company, who have been in Deadwood several days looking over their company's properties, returned east. They were greatly pleased at what they saw. The copper proposition on Lity creek is opening up nicely and so is the gold property in Two-Bit.

Manager James X. Praguson, of the Minera' Supply Co., at Robinson, and Daved Karth, of Park City, left Salt Lake City for Baker City, Oregon, on mining business.

JOHN B. PARISH is examining properties in Gold Mountain, Utah. In returning, he plans to visit the Muryavale section, which is attracting so much attention among Cripple Creek men.

tion among Cripple Creek men.

L. C. CLARK, of John Taylor & Co., San Francisco, Cal., has returned to that city from Alaska.

MESSRS, WADER & WADER, the well known assayers of Los Angeles, Cal., report receiving a ton of ore from the Merrimac mine, Chloride, Arla., to be tested in their two-stamp mill and concentrating table.

SENATOR W. A. CLARK, of Montana, with his brother, J. Ross CLARK, have left Los Angeles, Cal., for Arizona, where they will inspect some of their mining properties.

F. M. JOHNSON, former, meaning the city of the control of their mining properties.

F. M. JOHNSON, former manager of the Tom Boy

PROP. R. A. F. PRNROSE, well known in the west as president of the Commonwealth Mining Company, at Pearce, Artiona, who has been in Denver for some time, is now in California examining mining prop-

PROPESSOR REGIS CHAUVENET, president of the Colorado School of Mines, is visiting in Cripple creek,

RICHARD A. PARKUR, who is examining the sine field of southwestern Colorado, expects to return to San Francisco, shortly.

H. HAWGOOD, chairman of the Committee on mines in the Chamber of Commerce, of Los Angeles, Cal., reported that about 100 delegates to the Convention of the American Institute of Mining Ingineers, which is to be held in San Francisco, will visit Los Angeles on October 12. On the marning of their arrival a reception will be given to the visitors

A. A. BURKE, a mining man from Boston, Mass. is in San Francisco, California.

The Mining Jurgical And Metally Journal

THE MARKETS.

All quotations, Guancial reports and other statistical figures given under this head are New York Quotations, unless otherwise stated in each item. These figures are carefully revised each issue, and constitute a very accurate compilation of statistical matter.

New York, August 14th, 1890, The following are the Silver, Copper and Lead quotations for the last two

		SH VER.	COPPER.	LEAD
Aug.	16	1502 g	S 50	1.60
0.0	17	60%	18 70	4 55
	18	9, 31	,8 × 80	1.60
14	10	601	19 64	1.60
14	21	60%	18 60	1 57%
4.9	22	607.4	14 58	4 57
3.1	23	601	19 50	4.55
14	21	60	19 59	4.55
11	95	29118	18 50	1.60
+1	28	5968	18.50	1.60
14	18	5968	18 50	4.60
14	24	(968	14.50	4.60
		SH VER		

The market continues very firm and consumption in this country proceeds at a marvelous rate and appears to be on the increase. We quote for Lake copper 1712. In electrolytic copper a good business has been done at 17.22c and 17.35c. 17%: In electrolytic copper a good business has been done at 17.22c and 17.35c for cakes, wirehars and ingots, and at 17%: Purified, 98%99 per cent., in cases of 17%17.10 for cathodes.

LEAD.

The demand for lead at this season of the year is, as usual, very large. Prices have advanced somewhat and the metal of the season of the year is, as usual, very large. Prices have advanced somewhat and the metal of the season of the year is, as usual, very large. Prices have advanced somewhat and the metal of the year is as usual, very large. Prices have advanced somewhat and the metal of the year is as usual, very large. Prices have advanced somewhat and the metal of the year is as usual, very large. Prices have advanced somewhat and the metal of the year is as usual, very large. Prices have advanced somewhat and the metal of the year is as usual, very large. Prices have advanced somewhat and the metal of the year is as usual, very large. Prices have advanced somewhat and the metal of the year is as usual, very large. Prices have advanced somewhat and the metal of the year is as usual, very large. Prices have advanced somewhat and the metal of the year is as usual, very large. Prices have advanced somewhat and the metal of the year is as usual, very large. Prices have advanced somewhat and the metal of the year is as usual, very large. Prices have advanced somewhat and the metal of the year is as usual, very large. Prices have advanced somewhat and the metal of the year is as usual, very large. Prices have advanced somewhat and the metal of the year is as usual, very large. Prices have advanced somewhat and the metal of the year is as usual, very large. Prices have a decomplete for domestic supplied to decid are reported. Blue vitriol continues rather unsettled and powdered is duncted \$9.25, and \$9.50 (prices of \$9.25, and \$9.50 (prices of \$9.25, and \$9.50 (prices of \$9.25, and \$9.25, and \$9.25, and \$9.25 (prices of \$9.25, and \$9.25 (pri

is now quoted at 4.55@4.60. The for cign market is firmer and a good business has been done for export. Span.sh lead is being quoted at £14.10s. @ £14.1 lead is being quoted at £14.10s. @ £14.1 lead is growner.

From the same quotation given is not disclosed. The works are said to rowner.

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From the same quotation given is not disclosed. The works are said to rowner.

The demand for spelter has been better and it appears that consume sin general are not well supplied, there being signs as fall approaches that the demand signé astall approaches that the demand for galvanizing purposes will increase New York is quoted at 5.80, while the foreign market is £25 fbs for good ordinaries and £25 10s, for specials ANTIMONY,

Antimony continues in good demand, with prices unchanged at 10½c, for Cookson's; 10c, for Hallett's, "C" U.S. Star and Hungarian

Nickel continues unchanged and no alternation of prices can be reported. We quote for ton lots 33@36c per lb., and for smaller orders 35½@38c. Loudon prices are 14@16d. per lb., according to size of order.

The silver market has been firm. Less silver has been going forward because of the strike in Colorado and the scarcity months. New York is quoted at 30½c.

PLATINUM.

The demand for Platinum is active and prices continue high. New York is quoted \$15.50 per ounce for large lots and \$16@ 17 for smaller orders. The London quotation is 62@64s an ounce.

F. o. b., San Francisco, No. 1, 70 per cent, nitro-glycerine per lb, in carload lots, 17½c; less than one ton, 17½c Black blasting powder in carload lots, minimum car, 728 kegs, \$1.50 per keg;

COKE.

There has been a quiet trade in coke with a slight improvement reported.

Connellsville fdy coke 72-hr. Pry\$4.70	
New River \$4.00 Pocanontas 3.90	
Crushed 4.70	ı
Gas works coke, lump, per bushel 10	

The San Francisco market in Borax is firm with a good demand, powdered re-fined in ear lots 71/fe

Aluminum:	
No. 1, 99 per cent, ingots, per lb	351937€
No. 2, 90 11 11 11 11 11	31(3)34C 1
Rolled sheets, per lb	38с. ир
AluminumNickel, per lb	33@39¢
Alum bronze	20@230
Bismuth, per lb	\$1.45@\$1.50
Phosphorus, per 1b	48/650C
Magnesium	\$2.75@3,00
Tungsten, per 1b	70C
Ferro-tungsten, 50 per cent	doc
a cito-cuagacci; oo per ceasimini	THE PERSON NAMED IN

be near Pittsburg.

IRINGTONE

The market is uneventful. Demand continues fair and prices unchanged. Spot best sumixed seconds can be had at \$21.75 @ \$22.00 per ton, and shipments at \$20.0 @ \$20.75, while thirds are from \$1.75 @ \$2.00 less.

There is stil some talk of ligher prices but dealers continue to take orders at \$1.57½ (6 \$1.92½ per 100 lbs., while spot stock is offering at \$1.90 (0 \$1.62½ and one or two large sellers ask \$\$1.65 cm 100 lbs.

CHEMICALS

The San Francisco market in Borax is firm with a good demand, powdered refined in ear lots 7½c

The Minor Metals.

Quotations are given below for New York delivery:

Alumbrons.

No. 1, 99 per cent. ingots, per Ib...

No. 1, 90 per cent. ingots, per Ib.

MINES MUST HAVE WATER PROOF BELTS

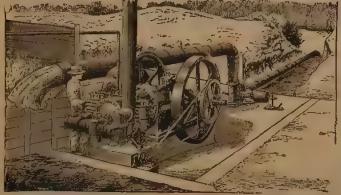
GLING-SURFACE will enter and fill a Belt (Leather, Cotton or Rope,) and make it Absolutely Waterproof; Will preserve the Belt, and by preventing all slipping, will allow the Belt to be run slack, giving greater pulley contact and therefore transmitting more power. We guarantee this.

PROF. CARPENTER, OF CORNELL UNIVERSITY.

CLING-SURFACE MANF. CO.,

167-172 Virginia St. BUFFALO, N. Y.

Represented in Salt Lake City by UTAH RUBBER & MANF. CO.



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The illustration shows the gigantic pumping plant recently built by the Hercules Gas Engine Works the Packer Ranch, Colusa Co. 80 h.p. Hercules Engine, pumping 7200 gallone a minute, 27 feeth, Burns Gas Gasoline or Distillate oil. Cheapest power known, Gas, Gasoline and Oil Engines, 2 to D. h.p. Send for Catalogue. HERCULES GAS ENGINE WORKS, **216** Bay St., San Francisco.





The Pulsometer Steam Pump

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Often Imilated--Never Equated Over 20,000 in Use

RECENT IMPORTANT IMPROVEDENTS

The Handiest, Simplest and Most Efficient Steam Pump for General Mining Quarrying, Railread, Irrigation, Drainage, Coal Washing, Tank-filling and for Pumping Rack Liquids heavily impregnated with sediment. Muddy or gritty itquids handled without injury to the Fump.

- AGENTS -

PARK & LACY CO., A. M. HOLTER HDW. CO., MITCHELL-STAVER & LEWIS Co. San Francisco, Cal. Nelena, Mont., Portland, Oregon.

Pulsometer Steam Pump Co. 188 Greenwitch Street, New York Olly

FINANCIAL NOTES. Average Prices of Metals

in New York per 100 lbs. from January

1st, 1899:				
Month	Copper	Tin	L'ead	Spelter
anuary	14.73	21.48	4.18	5-34
February	18.50	34:30	4.49	6.28
March .	.17-54	23.82	4-37	6.31
April	, tā 0,3	24 98	4.31	0 67
May	, 1R 15	25.75	4 44.,	6.88
June ,	17.93	25.85	4 4256	5 98
july	18 33	29.63	4.52	4.83
August				
Reptember			44.54.6	
October	1 110 111 11	1.4104	4119175	10-417
November				
December				4643.63
Average				

Average Monthly Prices of Silver.

In New York pr			JEBUSTY US
1800 and for the	years !	lgannd (Roy)	
Month	1909	1898	1897
	Cents		Cents.
IRIUBEY	59 36	56 77	64.79
February	59 12	66 97	61.67
March	59.64	64,90	63.06
April	60 10	n6 02	61-85
May	61/23	89.98	60.42
Time	60.43	(8, 6)	60.10
foly	60-26	59.08	89 G1
August		69,64	61.16
September		60,68	55,24
October		60.42	57.57
November		60.60	57.91
December		59,42	68.01
	_		
Venr.,		58.25	69.79

Comparative statement of the circu-culation in the United States on July 1st 1899. Comparison being made with statement on June 1st 1800.

			Chauges	
Gold	\$702,060,450	D.	\$22,221,710	
Silver	134,957 433	1	578,236	
Legal Tenders	310 547,349	D.	548,075	
Treas'y a N'('l B'k N'te:	4 330,435,386	D,	780,991	
Totals	1,477,103,627	D	\$22,972,552	

Gold and Silver certificates and currency are not included in this table. By adding the amounts given in this table with those in the following will give the total amount coined or issued. The

figures herewith are furnished by the Bureau of Statistics Treasury Department.

Comparative statement of changes of money in United States Treasury during July 1st 1890, comparison being made with statement, on June 1st, 1890.

Guld	427,939,977	I, 739,681 I, 548,075
Historia and an		

The Gold and Silver bullion on hand in the Treasury is not included in this

Gold and Silver Exports and Imports.

At all United States ports, for the mouth of June, 1800, and eleven months ending June, 1898, and 1899:

	JUNE.	
Gold- Expetts	1898 \$ 3,5,523 3,330,613	1890 \$20,90 ⁹ ,327 3,105,686
Риссия	I \$3, (55,) 23	世 \$ ~ Sez,641
Silver - Exports Excess	\$4,156.55 ajo38,803 85,\$2,137,847	#3.843.299 1,898.393 E. \$1,947,906

TWELVE MONTHS ENDING JUNE.

Gold-	1898	1899
Exports\$		\$ (0,522 086 88,954,603)
Excess 1.\$10		1, \$51 432,517
Silver-)
Exports		\$56,31,055 30,673,056
ExcessE. \$20	1.177.458	E. \$25,643,999

≒ WANTS ≝

Advertisements of this class containing not more than five lines will be unserted for not exceeding three months in any year, tree of charge, to all path-up annual subserthers. Other than above \$1.00 per month. Advertisements not accepted for less than one

COPPER MINE. State full particulars in regard to development work location, distance from water, price of fuel, character of ore and returns from sel, character of ore and returns from the character of ore and returns fr feet of development work. Send all in formation possible. Address,

JAMES HOWARD, Care The Mining and Metalfurgical Journal 150 Nassan St., New York, N. Y.

GOLD mine anywhere in United States, must have at less 1000 feet of development; where cost is not over \$6.00 per ton or wood \$4.00 per cord delivered; plenty of water; no objection to low grade ore if profit can be jection to low grade ore if profit can be will sell at a great targain.

1. R. R. Hotskept targain.

1. R. R. Hotskept targain. developement; where coal is not over made by having large plant to amal gamate and concentrate; want 6 months working bend; no property onsidered unless owners are prepared to deposit ce tified check for expenses of engineer if property is not as represented Address with price and full paticulars
J. E. M., flining and fletallurgical Journal,

EXPERIENCED men desires position, who can Install, run and keep in repair, Steam, Riectrical and Mining machinery, has knowledge of assaying and office work. References. Address: W. H. R., McCloud, Cal..

METALLURGIST and experienced Assayer and Chemist, with practical experience in Copper and lead smelting, desires position, Speaks Spatish, highest referrences, address "Globe", JOHNAL office.

NOTICE TO STEAM USERS

NOTICE TO STEAM USERS
The National Association of Stationary Engineers is prepared to furnish Engineers of guaranteed ability for any plant in the city or elsewhere. Give as a call.
Address: J. T. Chambers are y
Regime Room City Hall
Tel. Main 557.

COPPER MINE.

Pattiet wanted, (miner preferred) who would lived \$6,000 in developing a mining property in Mexico. Mine now working and has lately produced a onside a dramount of accompany of the object and alternate product of the object and alternate product to property of the narket. No a traiting great of Broker'or Middlemen. Call or address G. Peterson, 32 form two, San Franceso Cid.

FOR SALE

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MINING STOCK QUOTATIONS

ROSSLA	ND. BRI	TISH COLUM	BIA.	
Brand'n & G'o	fortk 29	Konteeny Gol	H 16	_
Canad G'ld F	icids 08	Lity May Lon & Van M.	P Co	_
Commander.		London R. C. Monte Cristo New G'd F'lds		00 07 00
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Fern Gold Fields of	B C -	Rambier Con Red Mount, V	lew.	28 80
Hall Mines Homestake	2 78	Reco Silver Bell Silver Queen		16
Iron Horse .	70	Slocan Star		10
Josle Jumbo Kenneth	265	Vic. Tr M De Waverly Min War Eagle Co	8.00	07½ 20 70
Keystone		White Bear	. ,	1ů

Keystone			White Bear	,	10
	SAN	FR	ANCISCO.		
Alta Con		84	Mexican		48
Andes		11	Occidental		26
Beicher		34	Ophir		1 95
Best & Belch	er .	46	Overman		17
Bullion		80	Ontario		
Caledonia		87	Plymouth .		_
Challenge .		36	Potosi		26
Chollar		28	Quicksitve		
Confidence	Sec. \$	00	Quickallyet	r prefd	^
Con. Cal. & Y	Fa 1	50	Savage		24
Crown Point .		28	Seg. Hetche	r	07
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Gould & Curry	
	11
COLORADO SPRINGS STOCKS	1
Acaria	16457242 5505357565437884
Gold King. 86 Union 3	1
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Alice	834 55 734 00 84 88 00 00 77 20 83 77
Geyser-Marion 45 Swansea 3 9 Golden Eagle 0512So Swansea . 1 5	21/5

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Alliance		Jennia Blanche .	67	G
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Argents in Lunique	70	Leadville Cons	10	6
Belcher	40	Marican	67	G
Best & Beicher	80	Mollie Gibson	25	G
Bort Geld		Mt Rosn	23	B
Breece	70	Oreidental	[8]	1
Cholles	15	Ontario	6 76	,
Chrysolite	21	Dharmadat	1 10	
Comstock Tunnel	04	Phoenix	ĬĬ	
Comstock Stricks.	04	Plymouth	10	Ę
Comstock berlipt,	U4	Portland	1 85	
Con, Cal & Vn 2	21	Potosi.	15	
Crescent Creek	15	Outoka Ivoz ord	2 00	
Grown Point	28	Rocky My untiln.	00	
CrippleCreek Con	11	San Juan Star		
Deadwond Perri	85	bayage	20	A
Elkton Corn	91	Sierra Nevada	65	4
Riterprise	m-19	Small Hope	1 25	,
Gold Colo C. Colo	•	Standard Con	9 55	A A BROOM
Gold Coln Gilnin	8	Syndicate	AR.	ĩ
Golden Fleece.	24	Union Con	33	C
Gould & Curry	40	Union	30	C
Gregory Gold		Utah Con	13	C
Hale & Norcross,	55	Union Gold		č
Howestoke 85	00	Vindicator,	74	ò
Horo Silver 1	40	Yellow Incket	33	C
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SPOKANE	, v	VASHINGTON.		GOL
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Binch Tail	12	Morrison Manhar Sia	16	I
Butte and Boston	14 1	Pearl	12	P
Deer Frall No. 2.	281	Princess Maude	16	į
Golden Harvest.	02%	Quilp	12	1
Insurgent	085	Rebate	. 20	1
tron Monitor,	091	Republic	1 30	3
Lini Bigine ,	64	Tom Thumb	25	18
L. PineSurp. Con	25	Wininer	33	9
Morning Glory	18			3
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Auchoria Leland	75	Lillie	12/8	1 3
Anaconda 49	90	Matoa	321/4	1
Arcadis	04	Mollie Gibson	2535	1
Argentum Junista	26	Moon Anchor .	1 10	П
Banner	023	401L, ROPE	28	1

Bit Lee	Zellorim .	08
Ruternelse 88	Pine Greek .	
Enterprise 08 Panny B 0035 Garfield 15 Geo Washington 005 Golden Engle 04 Golde Com	Portland	1 96
Garfield. 18	Prince Albert.	04
Geo Washington 003	Republic	77 06 28
Gulden Engle 14	Secremento	66
Gold Com 2 05	Smuggler .	28
Collain & C. C.	Specimen	111
Colder Flore	I RMAFFECK	74
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Ivon Clad BR	25 Virginia m	0.0
Isabella 34 Iron Clad . 08 Jack Pot 45	KVirginia M Law heels Cons Work	28
MI	EXICO	
Hame of Company	State	Price
Amistad y Concerdia		32
Angustiai Arevalo y Anexas, Asturiana y Anexas Barradon y Cabras Bartolome de Medina Cabezon y An. Candelaria de Pinos,	Guanajusto Hida go Encatecas	340 200 140
Arevalo y Arexas	Freeteens	209
Barradon y Cabrus	Distango	170
Rariolome de Medina	Hidelgo.	49 70 16 00 30 480 330
Cabezon v An	Zacatecas Durango Hidaigo	16
Candelaría de Pinos.	V	90
	Durango	30
Carmen., Cinco Senores y An	Hideigo	480
Cinco Senores y An	Guanajuato	840
Concepcion y Anexas	Mexico	
Concepcion y Anexas Coronas &1 Oro		72
El Oro, pref.	Guanajosto	30
Reparanza y An	Mezico Guanajuato Guanajuato Mexico Chikuahua Guanajuato	1,500
Gloria.	Chihuahua	50 250 30 20
Guadalupe	Guanajusto	250
Luz de Borda Aviado,	Michoacan	30
Bl Oro, pref, Beparansa y An. Gloris. Guadalupe Luz de Rorda Aviado, Luz de Rorda Aviado, Luz de Maravillas	Michoacan Michoacan Hidalgo	20
Pabellon Pabellon	Hidalgo	160 20
Palma de Somb	Zacatecas.	80
Pabeilon Paima de Somb, Pincles	Durango	2,000
Rafael v Annexes	Hidalgo	-1.00
Real del Monte	Hidalgo	750
Restauradora.	Durango.	20
Resario y Annexas 💎	Durango	.10
Ban Francisco	Hidalgo	190 400
San Kafaci aviado	Hidaigo.,	491 65
San Rather del Oro	S Tuis Potosi	776
Soluded.	Hidalgo	720 281 240
Sorpress		246
Triutged Aviador	Guana usto	90
Trinidad Aviado	Guanajuato	90 80 21
Tlausingo	Puehla	380 380
Paballon Palma de Somb. Pierles Rafael v Annexes Real del Monte. Retaurdora, Resano y Annexas Ban Francisco. San Rafael edi Oro Ste. Maria de la Pas Soledad. Sorpresa. Trinitad d'windor Trinidad Awado Trinidad Awado Trinidad Awado Trinidad Awado Union Hacieds Zona Min de Paz.	Hidalgo	380
Zona Min de Paz	Guanajuato .	81
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(Stock Transfer Office, Colorado Springs.)

Mines at Victor, Colorado Springs.)

Colorado Springs, Octo., May 19, 1898

Cardiemen:—We bought two years ago one of the largest size of the straight line type of logersoil-Sergeant Pill Co.

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Our mine is equipped exclusively with your drills and we have only the highest words of praise to give them.

Yours very truly, The Portland Gold Midning Co.,

Jas. A. Burns, Fresident

INCORPORATED MINES PAYING DIVIDENDS.

NAMES OF MINES		LOCATION	No. of Shares	Capital Stock	Par Value I	Amount of last Dividend	Date of Last Dividend	Total Amount Paid in Dividends	Produced
Aetna Cons		California .	100,000		2 5	\$ 10	July 1899	\$ 150 000 2 500	Q. G. C. I.
Alane Alaska, Treadwell	, ,	Utah	125,000 200 000	125,000 5,000,000	25	02 373 ₂	April 1899	1,070,000	
Alaska Mexican		Alaska	200,000	1,000,000	5	10	Apr 1899 .	358,031	G.
Anaconda .	,	Montana Colorado	1,200,000	\$0,000,000 800,000	25 1	1 25 08	May 1899	9.750,000 198.000	
An hona Leland American Gold	٠,	Colorado	300,000	3,000,000	10	09	Apr 1809		6, 8, 1,
American Coul.		Maryland,	60,000	1,500,000	25	1 25	March 1899	652 500	
Amerikan Zinc, Lewi and Smelting		Missour. Michigan	200 000 100,000	500,000 2,500 000	25 25	10 50	July 1899 .	20 000 890 000	
Aurora		California	200 000	2,000,000	10	10	June 1899	000 nu	
Aurora Argonaut Baid Butte Bonanza l'evelopment Boston & California Boston & Montana Boston & Montana Breece Bullion Bock and Champion Bunker Hill and Sullivan Canhoo Centennial Eureka Central Lead		Montana New Mexico.	250.000	250,000	1 1	06	May 1899 .		G, C. S.
Bonanza l'evelopment		New Mexico.	300,000 600,000	3,000, 000 600,000	10	3 50 06	June 1899	1 500,000 36 000	
Roston & California		Colora io .	15,000	750,000		5 00	April 1899	375 000	•
Bostor & Montana		Montana	150,000	3,750,000	25	6 00	May 1899	10 775 000	
Breece		Colorado	200,000	5,000,000	25 10	05 10	June 1899	50,000 2,378 100	I. G, S.
Bullion Beck and Champion. Runker Hill and Sollivan		Idaho.	100,000 300,000	1,000,000 3,000,000	10	07	May 1899	705,000	S. L.
Carboo		British Col	800,000	800,000	1	0114	May 1899 . Feb 1899 . June 1899	218 965	G.
Calumet & Hecis		Michigan	10,000	2,500.000		20 00	June 1899	62 850 000 2 100,000	
Centennial Eureka Central Lead		Missouri	30,000 10,000	1,500,000	50 100	50 50	June 1899	112,000	
Charleston		S. Carolina	10,000	1,000,000	100	2 00	June 1899	200,000	
Colorado Smelting		Mor tana.	100,000	1,000,000	10	1 00	Jan 1899	1,945,000	
Consolidated Tiger and Pourman		Utalio Colorado	1,000 000	1,000,000	1	02 01	Dec 1898	20,000 54,100	G, S.
Creston Lessing Crowned King		Arizona.	1,000 000 600,000	6,000,000	10	02	Dec 1898	232,000	G,S, L.
De Lamar		Blater	400,000	2,000 000	5	12	May 1899	2,846,000	
Deer Trail No 2		Washington	1,000,000	1,000,000	100	0025	June 1899	32,500 75,000	L
Doe Run EmpireState .		M stoner	5 000 75 000	500.000 750,000	100	50 20	July 1899 .	155,538	***
Fanny Rawlings .		Colorado	1,000 000	1,000,000	1	01	June 1899 . July 1890 . May 1890 . Mar 1809 . May 1809 . May 1809 . June 18 0.	10 000	G, 8
Ferrie-Haggerty		Wysteng	1 000 000	1,000,000	1	001/2	Mar 1899 .	5 000	-C, G , S ,
Garfield Consolidated .		Colorado Ontario, Canada	1,200 000	1,200,000	1	OE OI	July 1899 .	#1,000 41,000	17.
Golden Star	-	Colorado .	1 000 000	1 000,000	i	01		210,000	
Gold King		Colorado	1,000 000	1,000 000	1.1	02	May 1899	36,000	G.
Golden Cycle		Couramin	200 000 250 000	1 000 000	5	05 15	June 1899	198,500	G, S, Č. L
Grand Central		Utah California	20 000	250,000 1,000 000	50	25	June 1899	71,500	- 34, 55, O - U - G
Grass Valley Exploration		Cabiornia	50 000	100,000	5	25	June 1899	12,500	
Helepa an f Frisco		Idaho	500,000	2,500.0.0		25	June 1899.	550 00 1	
Highland Holy Terror		S. Dakota . S Dakota .	300 oco	10,000,000	100	20 01	July 1800	3,924 ,718 122,000	
Homestake		S Dakota	5 0 m	12,500 000	100	50	June 1890.	7 5 16 2 00	
Horn Silver		Utah	400 000	10 000,000	25	05	July 1890	5 270 000	8, L
daho		British Col	500 000	500 000	1	05%	3.81 TS50	292 000 448,500	4.5
lembella Fack Pot		Colorado Colorado	2 250 000 1,000,000	2,250,000 1,000 0° 0	1	0236	June 1899 Mar 1899	25 000	
Jamison		Catifornia	390,000	3,700,000	10	10	April 1899	50.710	
Lake Superior Iron		Michigan ,	94 000	2,100 000	25	1 00	Feb 1899	7.36 000	
Lille Modoc.		Colorado Colorado	1,000,000 500,000	1,000,000 500,000	1 1	05 02	July 1890 June 1899.	285-360 140,000	
Montana Ltd		Montana.	660 000	8 300 000	5	12	Apr 1809	2,097 657	
Montana Ore Purchasing		Montana	40,000	1,000,000	25	1 00	July 1899	1,200,000	
Morning Star Mengar		California	2,400 200,000	240,000 5,000,000		2 50	June 1890	732,600	
Mann otl		T'tah Utah	400.000	10,000,000	25 2 5		Jan 1899 . July 1899	1,430,000	
Mead ,		California	2,000.000	2,000 000	1	20	June 1899	120,000	
Monment Montes		Colorado		300,000	1		Dec 1898	12 6.34	
Mt Slasta		Montana California	400 000 20 800	2 900 000 100.000	5 5	30	Feb 1899 May 1899.	480,000 6,000	
New York & Hon. Resario		Central A	150,000	1,500 000	10	10	June 1899.	1 650 000	8, G.
Napa		California	100 000	700,000	7	20	July 1899	1,100 000	! Q
New Idria Quickeilver		Cactornia	100 000 200,000	500 000 2,000,000	5	20	July 1899	110,000 660,000	Q.
Driginal Empire		Ca iffina	50,000	5,000,000	10 1 0 0	25 1 00	Apr 1899 May 1899	500,000	
Jerenia		Ca crista Michigan	50 000	1,250 000	25	3 00	June 1899	2,80 500	C.
Parrot Pernaylyania Consolidated		Mertara	230,000	2,300,000		L 50	May 1899 .	2 600 898	
'loneer .		California California	51,500 ; 100,000	5,150,000 1,000,000	10 10	20 1214	July 1809 . Mar 1899 .	84,975 62 500	
Portland		Colorado	3,000,000	3,000,000	17	02	June 1899	2 197,080	G, 8.
Annikago Zamus er Prof		California .	300 000	300 000	1	15	Jan 1899. ,	45 800	G.
ganda er Cente 3 Intest		Cali orrin	43,000 67,000	4,800,000 5,700,000	1 (0)	50 40	May 1899 . July 1899 .	1,845,411 645,867	
history		Michigan	100 000	2,500 000		6 00	August 1899	11 070 000	Q. C.
Republic 4' problems		Washington	3 000 000	3,990,000	1	01	June 1899	183,000	
ta Abr Carbos Royal Cornobilated		British Col., Fritish Co	1,000,000 2,500,00	1.000 000 2 500 000	1	01	April 1899	50,000	15
sitamento		I tak	1,000,000	5,000 000	1 · · · · · · · · · · · · · · · · · · ·	01 0014	June 1899 July 1899	1.050,000 92,500	G.
mall Hoper Consolidated		Ceste cartes	250,000	5,900,000	20	10	Feb 1899	92,500 8,825,000	8.
talli hwaqaea tandard		f'tah	150 000	150 000	1	06	June 1890	126 56 0	- S, L.
eta Lirk Consontation		I lato California	500,000 200,000	500,000 20,000 000	100	10	Apr 1819 May 1899	1,745,000	(4, 4
R Joseph ,		Manager	30 000	3,000 900	10	556	June 1899	3,859,226 2,859,500 2,025,000	L.
silver King		T'fath	150 000	8,000 000	.20	25	June 1899	2,025,000	8, L, G.
lm szgler lwar seg		Co crado	1,000,000	1,000 000	1 6	- 01	June 1800	1,105,000	8,1, %.
Farvarack		Utah Mahigan	100 000	500,000 1,500,000	6 15	05 4 00	June 1899	166 500 5,910,000	
Comboy		Corrado	200 000	2,000,000		4 00	May 1899	780,000	C. G.
Utah Viminator Consolidated		Utah	100,000	1,000,000	10	02	Jan 1899	179 000	G
Vinitator Consolidated War Eagle Consolidated		Co crado Returb Col	2,000 000	1,000,000 1,500 000 1,000,000	I	0.5	July 1899	255,750	G.
Wolverine		British Col. Michigan	60 000	26 20(21 (102)	1 25	1 50	June 1899	335,250 150,000	C
Yellow Anter		California	100,000	1,000,000	10	10	May 1899	203,789	Ğ.
B bilver, G Gold, L		C Copper	. Q.					201100	

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Designed with some Regard for the Laws of Concentration

The perfect vanner motion given to the pulp by our head motion together with the freedom from "jumping" resulting from the special rigid guides used, explains why the Cammett riffles never "pack," and why the table has such a great capacity when handling slimes.

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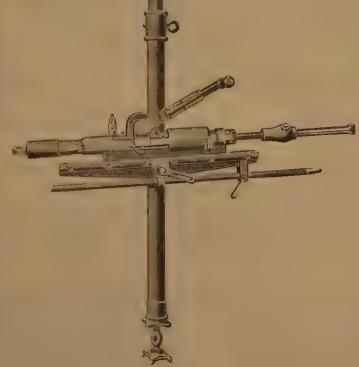
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Descriptive Catalogue on Application



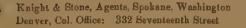
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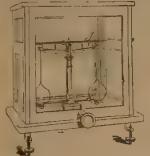
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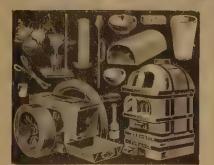
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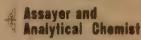
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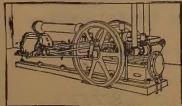


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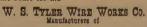
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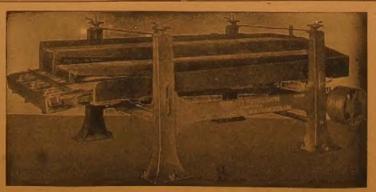
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